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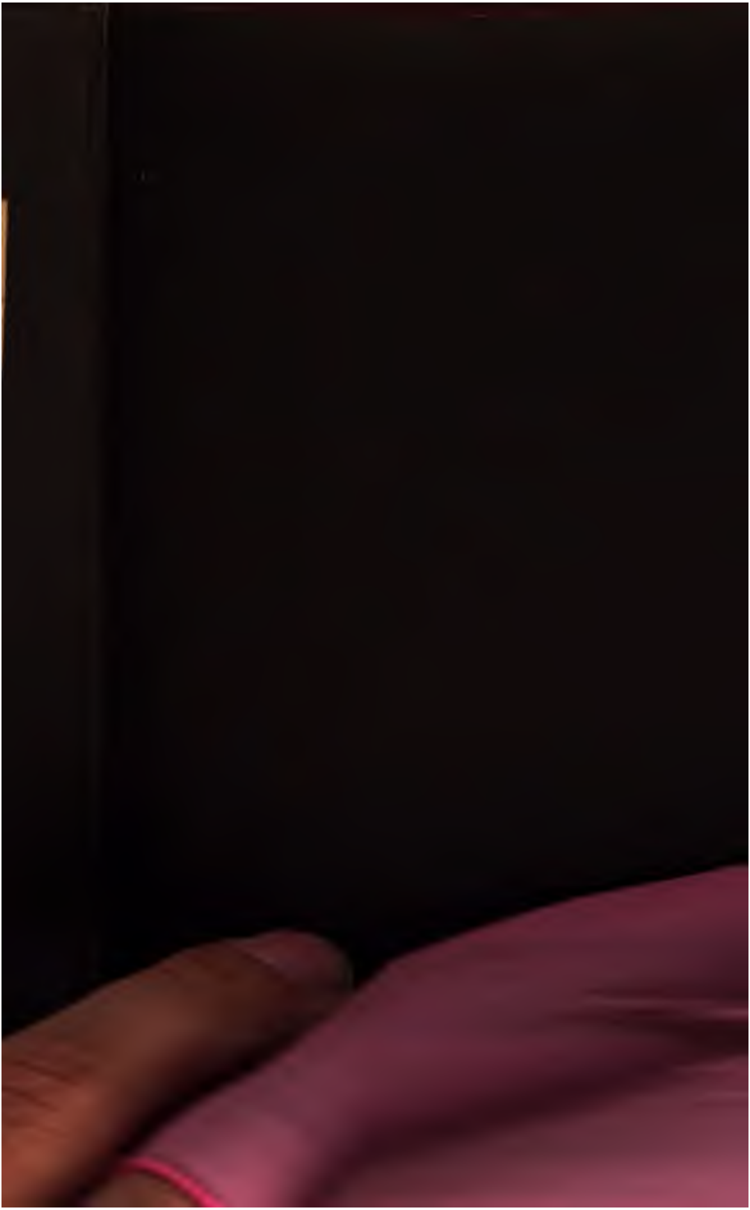

# ELEMENTS

OF

# PHARMACY, MATERIA MEDICA,

AND

# THERAPEUTICS.

# ELEMENTS

OF

# PHARMACY,

# MATERIA MEDICA,

AND

# THERAPEUTICS.

BY

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WITH LITHOGRAPHS AND WOODCUTS.

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TO

SIR WILLIAM MAC CORMAC, M.D., F.R.C.S.,

SURGEON AND LECTURER ON SURGERY, ST.
THOMAS'S HOSPITAL,

WHOSE NAME IS FAMILIAR WHEREVER

BRITISH SURGERY IS KNOWN,

THIS SMALL WORK IS DEDICATED,

WITH RESPECT AND ESTEEM,

BY THE AUTHOR.

# PREFACE.

THE aim of this little work is to give to the student of medicine such information in a concise form as he generally has to sift out of two or more of the larger manuals. So many valuable volumes have been written on Materia Medica and Therapeutics as to leave little necessity for another; but it is not the intention of the writer to presume that this work will take the place of any of them, the question of space necessitating the knowledge being given to the reader often in a very fragmentary condition.

The arrangement of the subject, which has been sanctioned by custom, has been departed from, the work being divided into distinct and separate sections, and the drugs arranged alphabetically. The writer found that most students in grappling with Materia Medica generally read the Therapeutics of each remedy once or twice over, while its preparations had to be almost committed to memory. Thus, a process of confused selection always distracted and prevented that clear view of each detail so necessary to ensure a thorough grasp of every branch of the subject. Many students, too, have already mastered the Chemistry of each drug in the laboratory, and hence to such, an arrangement like the one adopted will probably be beneficial; whilst to those who have not, the condensed bird's eye view of the subject may be appreciated. The writer is satisfied that this plan is open to serious objections as is the most generally followed one, but he hopes that it may assist the already over-taxed student who often fails to get any idea of the subject at all, if the matter be not placed in a condensed form within his reach.

Actuated by the feeling that Pharmacy is one of the most important sections of Materia Medica, he has laboured to put this generally neglected branch in as attractive a light as possible, and has called to his aid the few original woodcuts in the first part of the work.

This brief outline of Pharmacy is in no way intended to replace that *practical* knowledge of the art which the writer believes is an essential accomplishment of every educated physician, and which he hopes to soon see rendered compulsory by examining bodies.

The condensation required in every page to keep the work in a small compass prevented that full recognition of the labours of many in the advancement of Materia Medica, which the writer would have desired.

41, VICTORIA PLACE, BELFAST,
*December*, *1881*.

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# ERRATA.

Page 26, line 24 from top, for "loose" read "lose."
,, 184, for "Phodophyllin" read "Podophyllin."
,, 274, line 16 from top, for "It" read "Irish Moss."
,, 343, line 10 from bottom, for "quanties" read "quantities."
,, 350, line 4 from top, omit "the."

# PART I.

# PHARMACY.

## INTRODUCTION.

### CHAPTER I.

The words **Materia Medica** imply a description of the agents used in the treatment of disease, their preparation, actions. and uses; but owing to the rapid advance made in our knowledge of remedies, special terms are being daily used to designate the different departments in this extensive subject, and we confine the words

**Materia Medica** to the description of remedies,
**Pharmacy** to their preparation,
* **Pharmacology** to the science of their action on a healthy organism, and
**Therapeutics** to their application in the treatment of disease.

The term Materia Medica, even so restricted in its application, embraces Botany, Zoology, and Chemistry, and, indeed, is built up of these sciences.

---

* **Pharmacology.**—"To this word we no longer assign the old significance which it bore as a mere synonym of Materia Medica. It now implies the science of the action of remedies, and it accordingly deals with the modifications produced in healthy conditions by the operation of substances capable of producing modification."—*Professor Fraser, International Medical Congress, August, 1881.*

For convenience, the preparation of the remedies mentioned in the Materia Medica may be considered first, and since only the medicines authorised by law in the British Pharmacopœia will be referred to in these pages, we may divide the science and art of Pharmacy into two distinct divisions:

EXTEMPORANEOUS PHARMACY, and
OFFICIAL PHARMACY.

The first head will include the various operations of compounding and dispensing remedies from the prescriptions of the physician, and under Official Pharmacy will be briefly defined the different processes mentioned in the Pharmacopœia in the directions given for the preparation of its numerous drugs and formulæ, and under the same heading will be grouped together the official preparations themselves, mostly in tabular form, so that the student can have a bird's-eye view of their composition and doses.

The Pharmacology of each drug will be given under its name in the section of this work devoted to Therapeutics.

## CHAPTER II.

### EXTEMPORANEOUS PHARMACY, OR THE COMPOUNDING AND DISPENSING OF PRESCRIPTIONS.*

IT has been said that "no one should be allowed to *write* a prescription unless he is able to *compound* it," and if such were the rule of examining boards doubtless more useful and more elegant prescriptions would be the fashion, and even if it were not so, the training requisite to make a good dispenser would be a great accomplishment to the practical physician, teaching him habits of neatness, readiness, and accuracy obtainable in no other way.

---

* The student is often confused by the frequent use of the words "compounding" and "dispensing." The former may be said to apply to the mixing, blending, or preparing of the drugs ordered in a prescription, while the latter refers to the way in which they are put up, labelled, and sent out to the patient; thus the incorporation of a mixture of several substances is spoken of as its *compounding*, after which it is to be *dispensed* in a flat, square, or round bottle, but if a prescription, for example, should contain an order for twelve five-grain Dover's powders, it would be simply a case of dispensing, since the medicine is always kept compounded by the dispenser.

The compounding of medicines can only be really learned at the dispensing counter, but a few general directions will be here given as a guide to the student or a help to one who may find himself compelled to dispense his own remedies without previous training, and at the start he may be reminded that it is an essentially practical study.

Once the prescription is in the hand of the dispenser he must give it his undivided and concentrated attention. Day-dreaming must be for the moment laid aside, and in proportion to the thoroughness with which he isolates himself from everything but the sheet of paper before him, so will his success be. The prescription should first be read carefully through, and any inconsistency of dose noticed. Difficulties in reading and deciphering will nearly always disappear on a careful comparison of the formation of the letters in the doubtful word with those in the unmistakable portion. If an evidently poisonous, or even an unusually large dose is ordered, or if substances absolutely incompatible are prescribed, it will be well to consult the prescriber before proceeding further, but this will not be a likely or common occurrence. In compounding almost every prescription there are several processes continually being employed which deserve a few passing remarks.

**Weighing,** the essential element in which is accuracy, is generally only required in dealing with small quantities, as rarely more than one ounce of any solid is ordered in a prescription; more commonly it is only with grains or drams that the dispenser is directed to work, and in dealing with quantities from a few grains to as many drams the ordinary fixed upright beam and scales which are found on every dispensing counter answer all purposes. They are generally provided with one moveable glass pan, which should be opposite the operator's right hand, and on to which the substance to be weighed is to be gradually placed, the weights having been previously put on the opposite scale. The pan, or scale, should be invariably wiped with a dry cloth each time after use. The omission of this is one of the minute points that stamp a slovenly compounder, and as a rule he who will not take the trouble to leave his scales and weights tidy after him will not take the trouble to weigh accurately the medicines prescribed.

For minute quantities of powerful drugs like morphia, strychnia, and most active substances under two grains weight, the scales that are being constantly used to weigh as much as two or three drams should not be employed. For this purpose the small beam and scales figured should be used, and the substance gradually added, particle after particle, from a small spatula till the scale comes to the level of the opposite, and remains there. In this manner the $\frac{1}{100}$ of a grain can be easily appreciated.

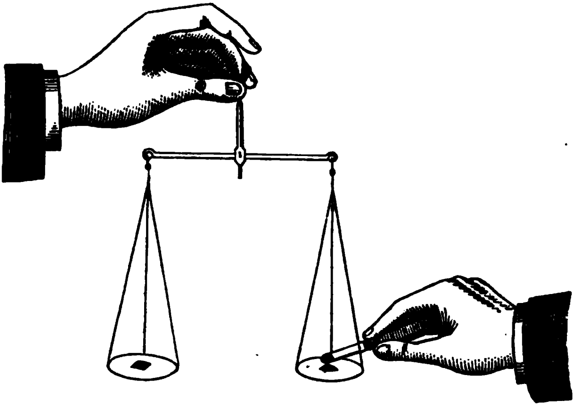

Fig. 1.

It is very often necessary to weigh small quantities of soft extracts for pills. This should only be done in this way :—Two little pieces of smooth writing paper should be made of the same size, which is accurately done by cutting a piece out of two leaves, one placed in contact with the other. When two pieces of precisely the same size and weight are thus obtained, one should be placed on the left hand scale along with the weights ; the other is to receive upon it the soft substance, and to be placed in the opposite scale, and when the requisite weight of material is added it can easily be detached from the paper with a knife. The same plan should be used with corrosive substances, like iodine, if the scale is not of glass.

The student should have clear ideas about weights ; the Pharmacopœia orders all solids to be weighed, and all fluids, except mercury and treacle, to be measured. It recognises no weight between a grain and an ounce, the ounce being equal to 437½ grains, and the pound being equal to 16 ounces, or

7,000 grains. These are the only weights that a student has to learn (unless that he is expected to have some idea of the metrical system).

It will be seen that in this weight, which is called the Imperial Standard, or Avoirdupois weight, there is no dram or scruple, but in the preface to the Pharmacopœia it is written that "it will be optional with the physician *in prescribing* to use the symbols of the dram (ʒ) and the scruple (℈), the former representing 60 and the latter 20 grains." However, it is now becoming the custom to order solids by grains or ounces, and confine the use of the dram to the liquid measure of 60 minims, or the $\frac{1}{8}$th part of a *fluid* ounce.

If, however, the dispenser meets with a dram or a scruple of a solid substance in a prescription, he is to put in 60 or 20 grains—(though strictly 54½ grs. and 18 grs. are respectively equivalent to the $\frac{1}{8}$ and $\frac{1}{24}$ of an avoirdupois ounce).

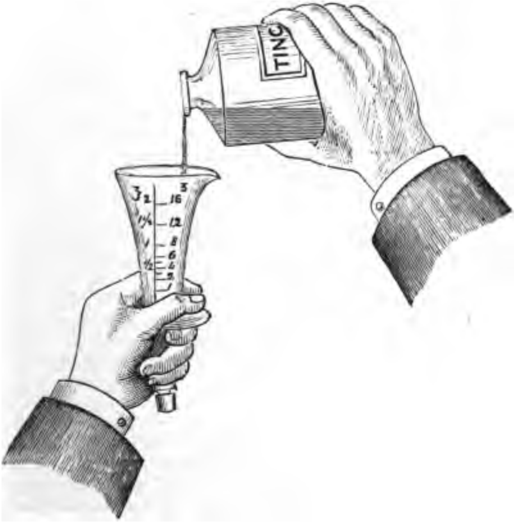

Fig. 2.

The **Measuring** of liquids is a simple process, but, like many others, requires care and practice, and should be done always according to rule. Graduated glass measures are used of various shapes, which should have the lines marked both in front and at the back. The measure should be held between the thumb and next two fingers of the left hand, as is well shown in Fig. 2, and raised nearly to the level of the dispenser's eye. The bottle to be poured from is grasped firmly by the right hand as in the figure, the stopper being previously withdrawn and held by the little finger of the opposite hand. The fluid is then poured out, the measure being held horizontally, the level of the liquid being tested by the lines on its front and back aspects. In looking through a quantity of liquid in a glass two lines or a double line may be noticed, the upper one being caused by the concave surface of the liquid, produced by capillary attraction. The lower line, which is the true level, is the one to be taken into account in measuring. *Never pour out with the label downwards*, otherwise the drop of moisture left on the lip will trickle down and injure it. The label should be *always* on the side of the bottle which is upwards, as in the figure.

For measuring small quantities of medicine, and it is generally an active medicine which is ordered in small quantity, the measure which is used for ounces should not be employed, as it will be found impossible to be accurate in pouring a dram into the bottom of a two-ounce glass. The measure which is figured should be then used; it is known as a minim measure, and contains either one or two drams. It may be held like the larger glass, but the careful and neat dispenser will hold it as in the figure, which does not interfere with the light passing through even a minute quantity near the bottom. Some hold the larger measure in the same way. In measuring liquids in very narrow glasses like the one figured, the surface of the liquid will be found to be *deeply* concave, owing to capillary attraction being stronger than in wide vessels, and it is sometimes puzzling to get the true level, which should be midway between the highest point close to the glass, and the lowest in the centre. It is not safe to count upon the lowest line as in working with the larger measures, because if we did the fluid which is attracted to the glass would not be included.

Substances like copaiba and castor oil should not be measured, not, however, because of the reason always assigned that the measure is so difficult to clean, for accuracy should sacrifice every other consideration in compounding, but because of the fact that if one ounce of such a substance is carefully measured about seven-eighths of it only will be got out of the

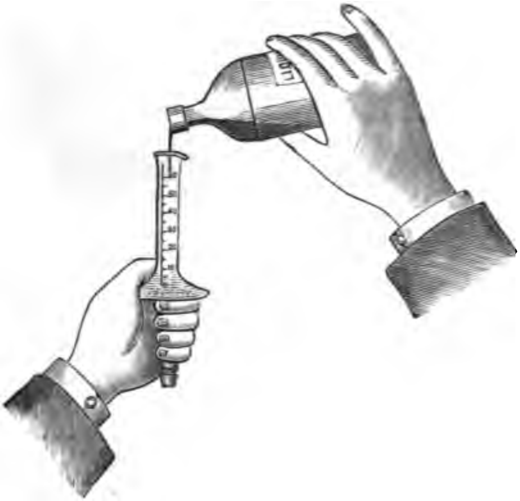

Fig. 3.

glass. Hence it is advisable to either weigh it, making some allowance for its specific gravity, or else pour it into the bottle in which it is to be dispensed, having previously marked with a strip of paper the extent occupied by an ounce of water in the same bottle. Before returning the stopper into a bottle out of which a liquid has been poured the drop that hangs from the lip should be caught upon the bottom of the stopper by simply touching it, thus continual moisture is generally prevented trickling down the side of the bottle; this little detail should be carefuly attended to in the case of acids, corrosive liquids, and syrups.

**Dropping**—Few have any fixed notion of how a liquid should be made to flow in single drops out of an ordinary stoppered bottle; a glance at the figure will do a great deal to dispel any difficulty in the matter. The bottle should be lightly grasped in the right hand by all the fingers, except the index one, and held in a vertical position with the bottom downwards, till the stopper is lifted partially out by the fingers of

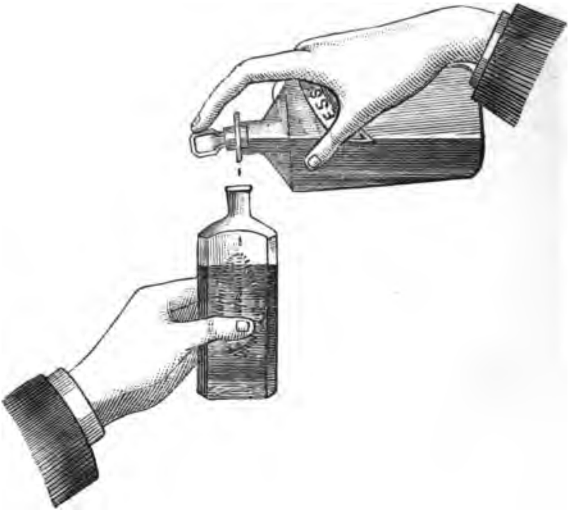

Fig. 4.

the left hand, and held there by the right index finger, which presses it downwards as the bottle is sloped to allow the liquid to drop out. Before permitting the drops to fall into any quantity of other medicine a few should be allowed to drop on the floor till the dispenser is satisfied he has perfect control over the regularity with which the drops issue from the bottle in his hand, otherwise they might come out with a rush, rendering it impossible to count them, in which case the liquid or medicine into which they fall must necessarily be rejected. This may be avoided by the unpractised dispenser allowing the drops to fall into an empty measure, when, if too many flow out, he can reject them without risking the liquid into which they are to go; but if the drops be volatile, like prussic acid or chloroform, this should not be done. It is a good rule to let each drop reach its destination before another flows out. If the drops hesitate to flow at the start, the lip of the bottle should be wetted. When the dropping has concluded the stopper is taken altogether out for an instant to allow the liquid accumulated about the neck to flow back again into the bottle before the stopper is thrust home; various bottles, with patent stoppers, have been devised to facilitate dropping; but, as a rule, every requirement is met by the above plan. The student should remember that a drop is a vague and indefinite quantity, supposed to be identical with a minim, which it seldom is. Elaborate tables have been prepared, showing how many drops of certain liquid preparations are found to correspond with one dram; thus it is generally stated that there are 120 drops of tincture of digitalis or opium in one fluid dram, and 45 of prussic acid in the same bulk. It is, however, well known that the number and size of the drops depend, not so much upon the nature of the liquid, as upon some accidental circumstances—as the shape and size of the stopper, or especially *the shape of the lip of the bottle*, and how much wet or moisture is about it, &c., &c. The system of ordering drops should be entirely given up, and minims directed to be measured instead, unless when two or three drops of a flavouring essence are ordered in a mixture.

# CHAPTER III.

## MIXING OR MIXTURE MAKING.

UNDER the term mixture in Pharmacy is included every extemporaneous fluid compound intended for internal use, except a few bearing distinctive names—as draughts or enemata. It would be difficult to give such general directions to the dispenser as would equally apply to the preparation of so many really different compounds as solutions, emulsions, decoctions, &c.; but a little practical experience will soon show him how he may apply the knowledge gained in making one class of preparations to aid him in compounding another.

Mixtures are ordered and dispensed in 2, 3, 4, 6, 8, 10, and 12 ounce bottles, and occasionally in 16 or 20 ounce; and taking the simplest form of mixture, where two or more fluid medicines are ordered together, it will be seen that the compounding of this will only mean the measuring of the different ingredients in a glass and pouring them into a bottle; still this must be done methodically, and attention to the following is advisable:—Until the dispenser has had considerable experience he should, after reading over the prescription, carry the different medicine bottles required from their different places and set them down beside him before he begins to measure, otherwise he "may loose his head" or get confused in travelling from one part of the surgery to another, this practice, however, should be no excuse for bottles being left upon the dispensing counter; after the mixture is made each should be carefully put back into its proper position; and the same law applies to every operation in Pharmacy, for nothing should be left lying about out of its place; it is in this way mistakes are often made. It will be noticed that in carrying a stock bottle from its shelf, collecting it with others where the dispenser is to work, and putting it back after he has finished, its label will be certain to be examined at least *three* times. The skilful compounder will make up a mixture more expeditiously by taking the measure glass in the left hand, as if about to use it as previously described, and the prescription between the middle two fingers of the same hand, and, proceeding with his right hand entirely free, walking to and fro he can compound his mixtures as quickly and accurately as if all were within the reach of his hand—as they should be when possible. This is well shown in the figure; care is requisite to prevent the paper being soiled.

As regards the *order* in mixing liquids for a simple mixture, it is not of so much importance as in making emulsions, and often they can be mixed as they are written. It is a good plan to pour the tinctures or spirituous fluids (as they are measured) into the bottle in which the mixture is to be made, mix them, and then add the syrups or essences, and finally fill up with the water or infusion ordered; in this way a better mixture is often made than if the tinctures were each singly added to a large body of water, when their resinous principles would be sure to be precipitated. Suppose in a prescription of eight ounces of mixture, containing two ounces of tinctures, one ounce of mucilage, and five ounces of water, if the dispenser added the mucilage to the undiluted tinctures an unsightly mess would be the result; the mucilage should either be added last, or largely diluted with the water before adding the tinctures; but the difficulty about the *order* of mixing ingredients will be found to be more imaginary than real, a little common sense and experience will soon overcome it.

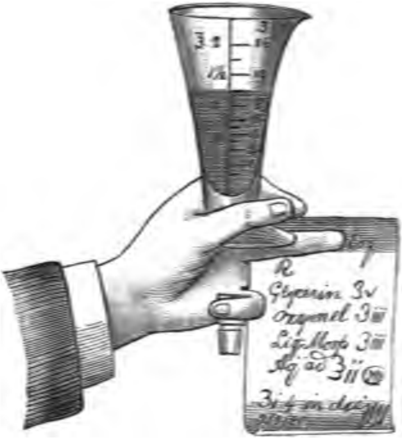

Fig. 5.

There is, however, one rule which is almost universally neglected, and it is of importance :—If there be a substance like prussic acid, strychnia, aconite, arsenic, corrosive sublimate, &c., ordered in a mixture, it should be put in the *last thing* before corking, unless there be some reason to the contrary. The force of this is obvious, for, if this be the dispenser's habit or rule, the possibility of his putting it in twice is out of the question ; and often when the attention is unavoidably arrested the ablest will forget what he has just accomplished. All mixtures should be briskly shaken before the label is put on to ensure thorough incorporation.

Distilled water should be invariably used; no doubt in many instances it will be of little moment, but a mixture made at one time with distilled water and at another with plain fountain water will taste differently ; and, on the whole, it will be found advisable always to use it to ensure uniformity.

Should a mixture be filtered if not bright and clear ? Unless specially ordered it should not, or unless some of the articles employed in its preparation were not as bright as they should be ; it should always be strained through wetted wool or tow, plugged lightly into a funnel, if any foreign particles are observed in it; this will almost always be necessary if the mixture has been made in a mortar; and most of the next class of mixtures get dirt incorporated with them no matter how careful the dispenser is, and there are often foreign particles mixed up with the salt before solution which are not visible till water is added. Suppose now the prescription contains a solid substance to be dissolved in the mixture, the dispenser, if the substance is very easily dissolved, may weigh it, drop it into the bottle. by means of a little paper bent into a V shape (off which most powders will pour like liquids), add the water, and shake briskly till the salt is dissolved; this often does away with the necessity of straining; but if the salt dissolve slowly, or if there be more of it ordered than the water will dissolve then it must be rubbed up in a mortar with a pestle—to use which skillfully and neatly requires a good deal of practice and care.

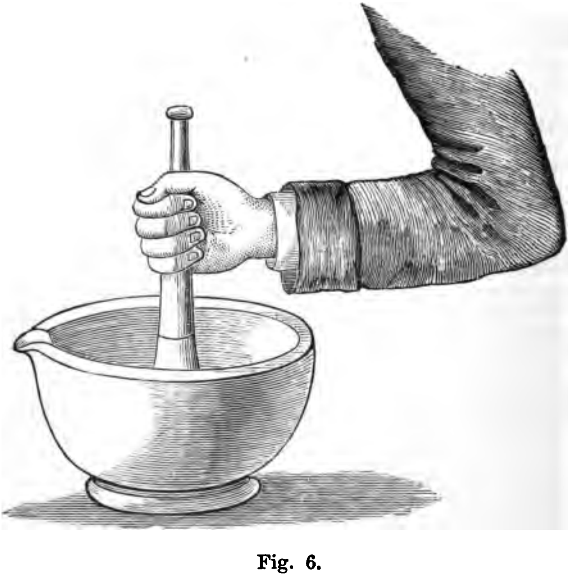

Fig. 6.

Fig. 6 represents the mortar being used to triturate a hard substance. The pestle is firmly grasped by the right hand, and power is applied from the *shoulder and arm, the wrist being kept rigid*, and the elbow nearly stiff. By a series of rotatory movements, chiefly at the shoulder joint, the pestle is made to travel slowly round the sides of the mortar—always being brought in the same direction, that is *towards* the operator's body, not from it—each rotation becoming shorter and quicker until the centre of the mortar is reached, when a few large sweeps bring it out to the sides again, and the same movements are repeated as before—the object being to crush each particle between the sides of the mortar and the pestle. The mortar should be steadied by the left hand, and as the material gathers towards the handle of the pestle, it is to be scraped off with a spatula—which should occasionally be swept round the inside of the mortar. In this manner hard gritty substances are reduced to fine powder; and if more of a salt is ordered than the water will dissolve it should be in this way well rubbed up with successive portions of water, and dispensed as a fine powder lying at the bottom of the mixture, and not, as is often done, presented to the patient in large crystals which he doubts whether to swallow or reject. Warm water would probably dissolve the salt and give a clear mixture, but, on cooling, large crystals would form on the bottom and sides of the bottle.

Another class of mixtures is often ordered where a vegetable powder, as rhubarb or ginger, or a substance like precipitated sulphur or bismuth, is directed to be compounded with water generally thickened with a little syrup or mucilage, in which cases the most careless would hardly think of pouring the powder into the bottle and filling up with water, as it would thus reach the patient in little hard lumps or knots. The powder should be weighed, and put into a porcelain or wedgewood mortar, with as much water as will make a paste, and after rubbing it smooth, more water is gradually added till a uniform mixture is obtained. The trituration here is of a different nature to that required in powdering substances or grinding them as in the last figure. In this instance the powder is already fine, and only its intimate admixture with water is required, hence the mortar is used in a different way, as Fig. 7 shows. A swift graceful movement is communicated to the pestle by the *wrist*, the handle being lightly grasped as a pen is held, and no motion should be allowed at the elbow or shoulder; as in the last instance the pestle is made to sweep round the sides of the mortar always in the direction inwards or towards the

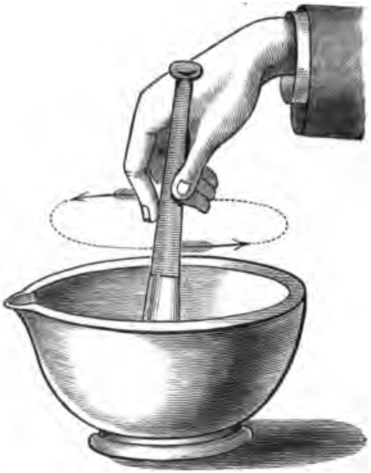

Fig 7.

dispenser, never "off" him. If syrup or mucilage is ordered to help the suspension of such powder in a mixture, it is advisable to rub the powder up with it first before adding water, and shaking all thoroughly before labelling.

When calcined magnesia is ordered in a mixture an exception to the above rule of rubbing in a mortar may be made; thus, suppose an 8 oz. mixture, with 2 ounces of syrups or tinctures, 2 drams of magnesia, and 6 ounces of water, be prescribed, here the dispenser may measure the water first in a large measure, weigh the magnesia and drop it on to the surface of the water, when it will gradually sink to the bottom as a perfectly smooth and uniform sediment. During its sinking he measures out the fluid ingredients, pours them into the bottle in which they are to be dispensed, by which time the magnesia and water are ready for pouring in on the top of them. This completes the mixture, which is whiter and more uniform than if rubbed up in a mortar, however clean.

Often a good deal of trouble is experienced with the froth that rises, especially upon vegetable solutions after agitation, preventing the bottle being filled or corked. A few drops of spirit cause this to rapidly disappear, and it is a good plan, if there be any spirituous liquid in the prescription, to keep a little of this to the last for this purpose. All mixtures with any deposit should have a label directing the bottle to be shaken before pouring out, and in all cases where the dispénser is in doubt about a mixture depositing a sediment he should err on the safe side, and put on a "shake the bottle" label before sending it to the patient.*

The next class of mixtures includes emulsions. They require more care and skill in their preparation and prescribing than most other extemporaneous compounds. An emulsion is a watery mixture resembling milk in appearance, containing an oil or resin in suspension, and not capable of easy or ready separation. The suspension of the oil or resin is effected through the agency of several substances, as gum, soap, alkali, or yolk of egg.

Several substances when rubbed up with water in a mortar make perfect emulsions, the gum-resins ammoniacum, myrrh, and assafœtida behave in this way. The milky mixtures thus prepared are called *natural* emulsions, and the explanation of the phenomenon is simple; each substance contains in addition to its resin as much gum as will suspend it when water is added. If the pharmacist wishes then to make an emulsion with a resin, he imitates this natural preparation by adding gum acacia, or tragacanth, such is the official mixture of guaiacum, in which the resin is ordered to be triturated with a little sugar and gum, adding gradually the cinnamon water.

Oils are emulsified either by rubbing with gum or by adding an alkali (which makes a sort of soap with the oil), or by both gum and alkali, which is the most common method. Copaiba is made into an emulsion in a similar manner. Volatile oils require to be mixed with some fixed oil before being made into an emulsion, or they may be rubbed up with yolk of egg.

The powered gum and water, or mucilage, should be measured into a mortar, and the oil gradually added, with continual light rubbing in the same direction, more oil being put in only after the first added has been blended with the water. Generally speaking, there should be as much oil as watery fluid at this stage.

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* It is the custom to direct all mixtures containing prussic acid to be shaken before use. This has arisen from a mistaken notion that the acid floats upon the top when the mixture is allowed to rest. Such is not the case, but the very volatile ingredients in a half filled bottle of mixture may rise in vapour and condense upon the inside of the empty part of the bottle, and on a dose being poured out it would contain a relatively larger proportion of the volatile substance, hence even in these cases a "shake the bottle" label should be put on, one thing being certain, it can do no harm if unnecessary.

If the mixture gets too thick during the rubbing, a little water may be added from time to time to thin it; and when all the oil is thus incorporated the mixture is poured into the bottle in which it is to be dispensed, and any other ingredients ordered are to be very cautiously added, each freely diluted before being poured in, tinctures or spirituous liquids always being added *last* in very small quantity at a time, and diluted ; neutral or acid salts if ordered must be very cautiously added, as they run a fair chance of spoiling the union of the oil and water, but many alkaline salts strengthen it.

Some dispensers put the powdered gum or mucilage into the bottle with a little water, adding gradually the oil, with brisk shaking; such a plan is not to be recommended. Alkaline emulsions may, however, be prepared in this way, and it is the way in which copaiba is generally treated; the alkali, commonly solution of potash, mixed with as much water as there is balsam or oil, is put into the bottle, the balsam added, and after brisk agitation, complete incorporation will be effected, the bottle being gradually filled up, with continual shaking. The balsam or oil is often weighed into the dispensing bottle, and this is the most correct method, but it should be remembered if a *perfect* emulsion is desired, this plan should not be followed, as the oil or balsam adheres so firmly to the sides that globules will always be floating to the surface after the dispenser thinks all is safe. This may be obviated by pouring the emulsion into a new bottle, after all the ingredients have been added. Liquid extract of male fern is generally ordered to be rubbed up with milk, fresh mucilage, or tragacanth, but egg will be found a better vehicle.

Tincture of tolu, friar's balsam, or tincture of myrrh, may be easily added to cough mixtures, when a small quantity of powdered tragacanth is ordered at the same time, and though the scrupulosity of the dispenser in closely following the letter of every prescription is to be admired, still if gum were added sometimes on his own responsibility, the unsightly messes which are presented to patients either through the oversight or innocence of the physician would be greatly improved. Sometimes the relations which exist between the physician and the prescriber will quite justify the latter in making an alteration, but it is a dangerous ground and he must always hesitate before interfering, unless where there appears a very evident necessity. Each case must be considered on its own merits, and no rule can possibly be laid down for the guidance of the young dispenser.*

Tincture of senega in small quantity has the power of emulsifying fats and oils very efficiently. 5 minims will emulsify ½ oz. of fixed oil.

The mixture having been compounded and put into the bottle in which it is to be dispensed, should be corked, and this should be done with care, as there are few things impressing the patient so unfavourably as a cracked, dirty, or badly fitting cork; the dispenser should take the measure of the neck of the bottle with his eye, before fitting the cork, and once it has been tried in the bottle it should not be put back amongst the others into the drawer, but regarded as a *soiled* cork. It is the custom to cover over the top of the cork with wax, on which the dispenser has his name stamped by means of a seal; coloured paper, leather, or tinfoil, may be used; if leather is used in tying over a bottle it should be very thin, and put on quite wet, and without a single crease; it makes the most elegant finish, but is not commonly used. Labelling should be done with the most scrupulous neatness and distinctness, all flourishes being condemned, and no mixture should reach a patient without being checked with care, when possible, by a second person.

**A Draught** is a small mixture which is to be swallowed at one dose; it generally contains 1, 1½, or 2 ounces, and is compounded and dispensed in every way like a mixture.

**Liniments, Injections, Lotions, Collyria, or Eye Washes, and Gargles** are compounded in the same way as mixtures, and the dispenser will have no difficulty with them. All poisonous external applications should be dispensed in differently shaped bottles from those used for mixtures, the blue glass hexagons with three fluted sides, are by far the best for this purpose, and less likely to be mistaken for mixture bottles than any others. Strong liniments, in addition to bearing the words "for external use only," should be marked "poison." Injections, mouth washes, or unusually strong gargles, should be marked "not to be taken."

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* It has been quite recently advised in the Pharmaceutical Journal that any additions to, or alterations in a prescription considered *absolutely* necessary by the compounder, should be marked by him on it in pencil, so that the medical man and other compounders may see them. This is an excellent suggestion.

**A Linctus or Lincture or Loch** literally means any medicine of such a consistence that it has to be licked or lapped off a spoon. They are not now often prescribed, and when the dispenser meets with them he mixes the ingredients together as for an ordinary cough syrup or confection, and dispenses them in a plain bottle, or if too viscid for flowing, he sends them out in a wide mouthed bottle or ointment pot.

**Electuaries, Conserves or Confections**, are mixtures of a pasty consistence, containing generally powdered substances, made into a soft mass with treacle, syrup, honey, &c. The substances prescribed in this form, if not already in fine powder, must be reduced to this condition and sifted; sulphur, rhubarb, jalap, ginger, and sulphate of magnesia are occasionally ordered in this form. The powders should be carefully triturated in a large mortar, and when thoroughly mixed the saccharine substance should be gradually added till a smooth, uniform, and impalpable paste is obtained. The powders should never be stirred into the treacle or honey, but the latter should be poured in upon the powder, and when compounded, the confection, if very soft, should be dispensed in a pot in which there is plenty of room for stirring up. If sulphate of magnesia is ordered, the dispenser may use the dried salt, allowing for its strength, as it is almost impossible to pulverise the ordinary drug.

## CHAPTER IV.

### THE COMPOUNDING AND DISPENSING OF POWDERS.

Though nearly every vegetable substance in the Pharmacopœia may be prescribed in the form of a powder, still the list of commonly ordered powders is not very long. The physician may order substances to be dispensed in this form which are not kept in powder, and the dispenser will consequently be obliged to pulverise them. This is done on the small scale by using a mortar like the one in Fig. 6 ; the pestle is grasped in the same manner, but wielded very differently ; it is raised and lowered in a quick or jerky fashion for a few inches, and in a straight up and down motion from the elbow, each stroke being aimed at a particle, which is thus crushed between its end and the bottom of the mortar. When the coarser pieces have disappeared, the pestle is to be used as in Fig. 7, and the powder ground between the sides of the mortar and the end of the pestle till the required fineness is obtained. The mortar for such an operation should be of wedgewood, and not too highly polished, as the roughness of its interior facilitates pulverisation. If the substance to be powdered for a prescription happens to be a root, or leaf, or herb, which is rare (as such are almost always kept powdered in stock), then an iron mortar with a lid is to be used, for any considerable force should not be employed with a wedgewood or porcelain pestle. After the grinding has been performed till single particles are no longer visible to the naked eye, the powder should be passed through a fine sieve, and for very small quantities it is sufficient to extemporise a little sieve by stretching a piece of fine muslin over the largest sized chip ointment box, out of which the bottom has been knocked, and securing it with a string or tight hoop like a drum head.

The bulk of a powder varies. Generally prescribers order under twenty grains, often about five are prescribed. If only one powder is to be sent to the patient it is simply weighed on the scale and placed upon a piece of paper, and, if containing more than one ingredient in a single powder, they should be carefully mixed on the paper with the point of a knife, for though the patient is to swallow the entire powder without division, and its mixture is practically of no importance, it looks careless, and does not impress him favourably on being able to distinguish different shades of yellow and blue in what he is about to take. Powder papers should be glazed, and for small powders about 4 x 5 inches. Different shades of colour are used by different dispensers, and some even prefer the paper unpolished. As a rule paper such as is used for writing on is suitable.* To fold a powder requires a good deal of care and practice, and once learned it is never forgotten, and is useful when applied to many other little operations. Though so simple, it is, however, a very difficult task to describe in writing.

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* The white glazed demy, manufactured specially for the purpose, and sold by druggists' sundry-men, is the best powder paper. It may be had cut in different sizes.

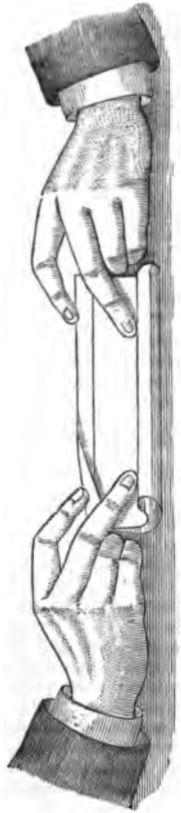

Fig. 8.

The following is the old-fashioned way of folding a powder:—

The powder being placed on the centre of the paper which lies flat on the counter before him, the folder seizes the margin furthest from him between the second finger and thumb of his left hand, at the same moment seizing the near margin with the corresponding finger of the right hand; he brings them together, their edges looking directly upwards, only the edge of the margin nearest is half an inch higher than the edge which is furthest off him. This is very plainly seen in Fig. 8. The margins are held in this position with the second finger and thumb of each hand, while the folder turns down in a flap with his index fingers the upper margin over the lower. (The figure shows this turning down as having commenced at the right hand corner.) The flap thus produced is turned over and bent upon itself, which finishes the folding process, except the bending down or in of the ends, which is done, as Fig. 9 describes, by simply bending them between the finger and thumb, or by creasing over a powder folder made for the purpose, which secures all the powders being of exactly the same length. Some dispensers bend down the ends over a flat-bladed knife. After the powder is thus folded its appearance is much improved by passing the blade of a spatula or ivory paper knife firmly and rapidly over it, re-

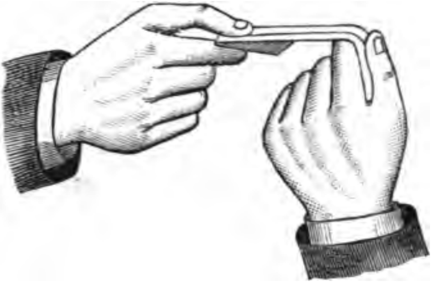

Fig. 9.

moving every crease, and preventing the mass of the powder causing a bulging in the middle. This is always necessary when the powder weighs more than a scruple, and it is especially necessary when any considerable number is ordered to be dispensed in a box or envelope. Care is requisite in passing the spatula over bulky powders to keep the blade perfectly flat or horizontal, as otherwise its edge will readily tear through the paper. Very large powders, containing substances like Rochelle salt, soda, &c., can be uniformly flattened by striking them gently several times with the handle of the knife before passing the blade over them.

Pharmacists, however, nearly universally fold a powder in this way :—The dispenser places the paper before him on the counter or table with the powder in its centre, and brings the border of the paper furthest from him within half an inch of the border next him ; secures it in this position with his index fingers, whilst with his thumbs he turns the half inch of margin of the paper next him in a flap over it. This is again folded over on itself, which completes the folding (Fig. 10) the ends being turned down as in the first instance by the fingers, over a knife or on a powder folder.

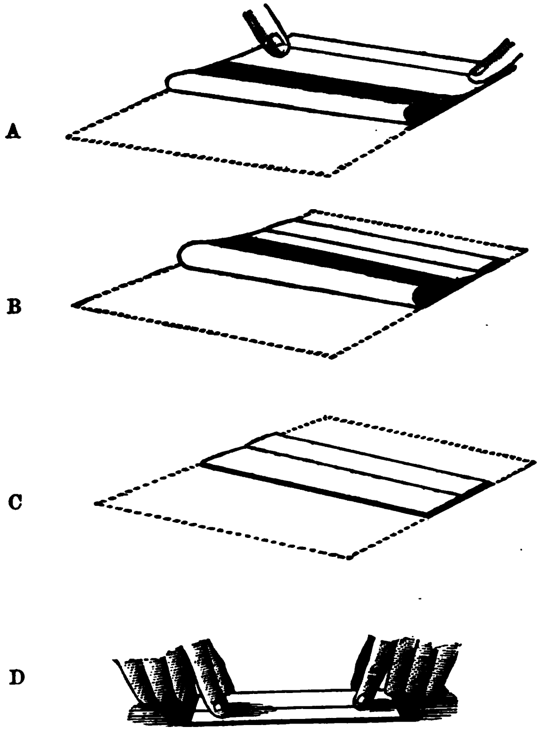

Fig. 10.

A represents the furthest edge brought towards the folder; in B the edge next him is turned over in a flap upon this; in C and in D both are together turned over in a second flap; and the folding is completed except the turning back of the ends. The dotted lines show the space originally covered by the paper.

In this method the powder is technically said to be folded "to" the dispenser. Most commonly, however, it is folded "off" him, and this is the proper way, only it is more difficult to see it for the first time. It is done in the same way, precisely, except that the near edge of the paper is brought to within half an inch of the furthest edge which is turned over on it, and again both are turned over as before.

The following still simpler method of folding a powder may be easily mastered by the student :—He places the paper before him with the powder in its centre, and turning back into a flap about half an inch of the margin next him, he smooths it down flat upon itself. Into the crease of this flap he inserts the edge of the paper furthest from him, and bends both over exactly as in the two previous instances, and finishes the ends as before.

The first method is the most difficult to accomplish, but it is the best, as by it the dispenser folds large bulky powders, like magnesia, Gregory's powder, &c., which cannot be properly folded otherwise. Suppose 2 oz. of sulphate of magnesia is to be dispensed in a paper, the dispenser weighs it out on a paper, and proceeds exactly as in the first instance of folding a small powder, as in Fig. 8. He does not, however, fold back the ends over a folder, but gathering in loosely the left end, he closes it so that the packet can stand upon it, like an upright cylinder open at the opposite end. Into this end he inserts his right index finger, and folding the paper round it, he withdraws it, causing the end to retain the creases into which it falls. He then bends down the folded in flap, and undoes the end upon which the packet was standing, which now goes through the same process as the right end, after shaking down the contents and making the surface even. Practice only will enable the dispenser to fold a packet in this way, as it is impossible to clearly describe it in a book. The little time lost will be amply repaid by the education which the fingers receive.

If more than one powder is ordered the dispenser proceeds in a different way. Suppose, for example, twelve five-grain Dover's powders are to be dispensed, two ways are open to proceed. First, spread twelve papers out on the dispensing counter in four rows of three each. Weigh 5 grains, and place it on each paper till the dozen powders are weighed out. Then begin to fold one after another till all are finished. This is a tedious plan, and, strange as it may seem, is not generally so accurate as the following :—Weigh 60 grains, place it on the centre paper, and divide the heap with a knife into twelve portions, now adding a little to one and taking some from another, till the *eye* is satisfied that all are about equal; or till a little practice is obtained weigh out 30 grains and divide into six papers. It is surprising how the eye so soon becomes educated to discriminate small differences in the size of the powders. This method, however, is not applicable to large powders, and should only be practised after very considerable experience of weighing.

Ordinarily in prescribing powders the medical man writes the form as if for one powder, and then directs say twelve such to be sent; hence twelve times the quantity of each substance is weighed and put into the mortar (avoiding contact of the glass scale pan with the mortar as the dispenser throws in each powder), generally in the order in which it is prescribed, for, as a rule, it matters little in what order the ingredients are mixed, provided they have been previously in a state of fine powder; but if a very small quantity of an active ingredient be ordered it should first be put into the mortar with about twice its bulk of some of the more inert ingredients; and after careful trituration, using the pestle as shown in Fig 7, the remaining substances are gradually added. The mass of the powder should not be divided until the most thorough mixture has been accomplished, and streaks of colour through it are unpardonable.

Sometimes the physician orders a certain weight of the different ingredients to be mixed and *divided* into a number of powders. Here the dispenser might make a terrible mistake if he multiplied the quantity by the number of powders instead of dividing, and he should be always on his guard against such an accident. Substances are sometimes ordered to be dispensed in this form that are perishable, as ergot; or volatile, as camphor; or deliquescent, as carbonate of potash; or liable to chemical decomposition, as sulphide of calcium, or the valerianates; in which case they should be folded up in the ordinary paper first, or preferably in waxed paper, and then each one covered with tinfoil, and sent out in packets of 4 or 6 which are again covered with an extra piece of the foil, and if to be kept for any time they should be enclosed in a wide mouthed bottle.

Sometimes powders like Gregory's, ginger, soda, rhubarb, &c., are prescribed in quantity with directions for a teaspoonful or other dose; or powdered borax is prescribed for injecting. In such cases the dispenser should send it in a wide mouthed bottle, well corked,or even in some instances with a glass stopper.

When as many as six or eight small powders are ordered they should always be folded exactly of the same length on a

**folder, and sent in a cardboard box. Numbers under this are generally dispensed in small oblong envelopes, made for the purpose, and on which the directions can be written like the address on any ordinary letter. If sent in a box or bottle a small label is gummed on the outside.**

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## CHAPTER V.

### COMPOUNDING AND DISPENSING OF PILLS.

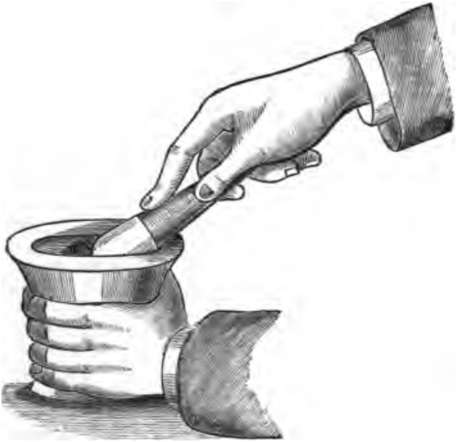

Fig. 11.

**THIS is perhaps the most difficult work of the dispenser, from the complexity of the process through which the mass has to pass before the finished pills are in a proper condition to be presented to the patient, and partly also because he is often left completely to his own resources to unite, in a pilular form, in-**

gredients unsuitable and without any cohesive property. Pills should be perfectly spherical, and should not be larger than can be readily swallowed without chewing; each should not exceed 5 grains in weight, unless the ingredients are exceptionally heavy—as calomel, bismuth, reduced iron, blue mass, &c.—when 8, 9, or even 12 grains may be with skill compounded in a fair sized pill; on the other hand, as many as 5 grains of a light vegetable powder will be sure to make too bulky a pill, as the weight of the excipient or material added to give body must be taken into account. The choice of the excipient is often left to the dispenser, and some experience is necessary to guide him in his selection. The most common are: gum or mucilage, soap, syrup, spirit, or some soft extract inert in very small doses, as gentian. Mucilage, the most commonly used excipient, is well adapted to make vegetable powders into pills, but, as a rule, its use should be restricted to pills that are soon to be consumed—otherwise, they will get very hard and insoluble. For mineral powders it is not so suitable, as the pills made in this way are apt to flatten, or "go down," as it is technically called. Tragacanth is a very good excipient, it is especially so when added in powder to masses which are already too soft, as it gives body and elasticity; but, if used too freely, the pills retain the cylindrical form, and after a short time may loose all traces of rotundity; tragacanth and water give good consistence to substances like nitrate of bismuth. Honey and treacle are used in preference to mucilage, as they make nearly as good a body but with less risk of becoming hard. Syrup is used for the same purpose when very little room is left for the excipient, but it makes crumbly masses with metallic salts. Soap makes an excellent pill when added to resinous substances, it does not get hard, and is not apt to crumble—unless a substance like sulphate of iron is added; fine sifted sawdust has been highly recommended as an excipient to give toughness to soft masses, by Mr. Proctor; it imparts great retentiveness of shape, with little increase in size. Recently Mr. Lascheid has pointed out the great value of glucose as an excipient.*

Spirit is used in working up resinous substances; it is, however, very difficult to work with, as there is great danger of adding too much, which causes the mass to "drop," and if too little be added no effect is produced at all. The dispenser will see he has a long list of excipients, of which the above is only a sample, but a little experience soon will teach him that when he gets to *know* an excipient he can do almost anything with it; and most pill makers have their favourite. The writer, in recommending an excipient for *general purposes*, believes that few can be found equal to a paste made of

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* *American Journal of Pharmacy*, July, 1881.

Powdered Tragacanth, 1 dram;
Glycerine, 3½ drams;
Water, 1 dram;

which improves by keeping; and the inexperienced dispenser will be amazed how little of this substance will be sufficient to give consistency, toughness, and retentiveness to the most unpromising mass.

The dispenser—having read over the prescription, and thought of the excipient which he will use, if such is not already directed by the physician—proceeds now to weigh the different ingredients, taking the substances that require pulverisation first, when all the dry ones are thoroughly mixed, the soft extracts, weighed on paper as is directed under "Weighing," are added, and the mass worked up in a mortar.

The proper mortar is figured at the beginning of this chapter. It is very shallow, there being one mortar or shallow depression generally in each end of it, it should be of unpolished wedgewood ware, and very thick, with a small pestle—which is to be worked in a totally different way from any yet mentioned—the pestle being used as a lever, with the edge of the mortar next the operator as a fulcrum; and great force is necessarily applied, by which the substance is squeezed between the end of the pestle and the side of the mortar at each stroke, the mortar being firmly grasped by the left hand and turned round occasionally, so that all parts of the pill mass are exposed to the action of the pestle. It will thus be seen that the process is one of squeezing or kneading rather than pounding.

The student will do well to review at this place the different methods of using the mortar and pestle, as required for different results, and a little reflection will teach him more than a year's blind practice, for unless he has some idea of the scientific action of the machine, he can scarcely chance to wield the pestle efficiently or gracefully. It is used in at least four different ways:—1.—(As shown in Fig. 6.)—The pestle is grasped firmly, the wrist and elbow joints kept almost rigid, while the pestle is made to traverse the sides and bottom of the mortar, all the motion being at the *shoulder* joint (circumduction). 2.—The pestle is grasped in the same way, the wrist and shoulder joints are fixed, while the fore arm is raised and lowered alternately—as a gold-beater uses his mal-let—all the motion being confined to the *elbow* joint (Fig. 6). 3.—The pestle is grasped like a pen, and with a light quick easy motion at the *wrist* it sweeps round the inside of the mortar (Fig. 7). 4.—The pestle is grasped by the fingers, the expanded end of the handle being firmly planted against the centre of the palm, its middle resting against the inside edge of the mortar; when the three previous movements are executed and the pestle is driven slowly and forcibly against the opposite side of the mortar—the pill mass being between; here *shoulder*, *elbow*, and *wrist* are vigorously in motion (Fig 11).

The ingredients being worked into a uniform stiff mass in the mortar are to be scraped out with a small spatula, and it is a good plan to work the mass for a few minutes between the fingers, which softens and toughens it. It is next rolled into a ball or cylinder with the finger and thumb, and transferred to the marble slab of the pill machine, on which is dusted a little finely powdered chalk, starch, or lycopodium; the back of the handle of the machine is used to roll it into a long cylindrical form, great care being required to prevent the cylinder tapering out thin at either end; a very light and quick motion backwards and forwards will prevent this—the handle being held perfectly horizontal, as shown in the sketch—(Fig. 12)—and each hand bearing an equal weight on the mass as it is rolled backwards and forwards over the slab. It is brought from time to time alongside the scale, and when the number of pills into which it is to be divided corresponds with the number marked there, it is gently lifted or rolled with the fingers on to the grooved part of the machine, the handle, with its grooved surface

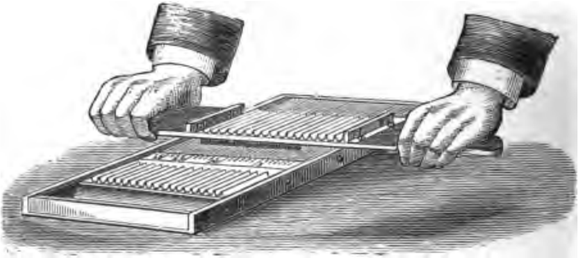

Fig. 12.

downwards, is laid on it, and by a series of rapid and short movements, with both hands, abruptly brought to a close by pushing the handle from the dispenser, at the same time turning it on its own axis in his hands, the cylinder is cut and rounded into globular pills, which, with the last motion, are pushed into the box or tray at the end of the machine. If the operation is successful, and the mass of good consistence, no further handling will be necessary ; but generally the track of the machine will be visible in each pill, and another process is required before the smooth globular form is perfect. The pills are again placed on the dusted slab, and covered with a pill-finisher—which is only a circular shallow boxwood tray, not so deep as the pills—and by a series of rapid rotatory movements the traces of the machine are dispelled, and a more spherical and polished appearance is given. If the pills are very soft this cannot be successfully done, but they must be rounded separately between the finger and thumb.

There is another and more convenient method of making pills in small quantities ; it is by means of the graduated tile and a spatula. The ingredients are weighed and placed on the tile—which is of porcelain or wedgewood ware, with very little glaze on its surface.

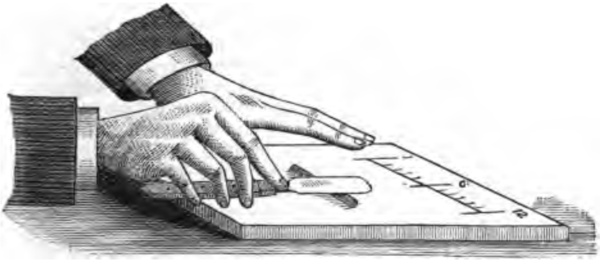

Fig. 13.

With the square end of a stout spatula the mass is worked into a uniform consistence, and, after a little kneading with the fingers, it is rolled out between the blade of the knife and the dusted slab, brought to the scale and cut into pieces which are rounded into pills between the thumb and next two fingers of each hand. Figure 13 shows the rolling out process;

or the mass may be made in the pill mortar, and transferred to the tile where it can be rolled out and cut.

Machines are now made on the cylindrical roller principle, by which as many pills can be prepared in an hour as the old fashioned machine could turn out in a day, but they are only useful where very large quantities are to be rolled out at once.

The pills having been prepared as described, should be left out to dry (unless urgently required), either on the slab of the pill machine or in some dry and warm place whilst the label is being written and the box prepared in which they are to be dispensed. The box should be large enough to hold them in a single layer, otherwise they will be sure to stick or become flattened. Pills containing volatile ingredients should be always dispensed in a bottle, of which there are many kinds manufactured for the purpose with wide mouths. Some powder must be put into the box or bottle to prevent them adhering to each other, or to the vessel, and different dispensers are in the habit of using different powders for the purpose. Chalk, lycopodium, flour, liquorice, &c., are used; powdered French chalk will probably be found to be the most beautiful and efficient.

The coating of pills has seen many changes of fashion, and doubtless will, but it is questionable if ever a more satisfactory method will be introduced, than the old fashioned plan of covering the pill with a thin layer of silver leaf. To do this properly requires some neatness and care. The following directions, if followed, will give a successful result:—The silver leaf as it lies flat in the book in which it is originally manufactured, is exposed, and each pill is rolled between the thumb and next two fingers, which have been previously rubbed against a little mucilage dropped on the slab of the pill machine, and when a sticky layer is felt to be imparted to the pill, without being so abundant as to drop off or run, it is allowed to fall on the silver leaf, and another treated in the same way, until twelve or fifteen pills are dropped at equal distances apart on a single leaf. By this time the first ones may have become dry, to guard against which, the breath is to be blown over them, the mouth being held open, close to the leaf. The silver leaf with the pills on it is allowed to quickly slide off the book into a spherical, or egg shaped boxwood vessel, which is to be shaken cautiously, the hand containing the box being turned round, making a circle in the air, so as to cause the pills to run round its inside for about one minute, when an even and lustrous coating of metallic silver will be seen adhering to and completely covering each pill. Any loose fragments of leaf can be blown away, and after a short exposure to the air on the slab, the pills may be enclosed in the bottle or box in which they are to reach the patient. Gold may be applied in the same way. Pills containing blue mass in any considerable proportion should not be silvered, the mercury making an unsightly amalgam with the silver leaf. Assafœtida, when coated, turns the silver black, and consequently gold should be used.

Pills are sometimes coated with gelatine, which is both soluble and looks well. A strong solution is made by heating one part of gelatine with two of water, and each pill stuck upon the end of a fine pin, is dipped into the solution, the other end of the pin being thrust into moist sand till the gelatine sets, when the pin is withdrawn, and its mark closed with a little fresh gelatine.

A new process is rapidly coming into favour, of coating pills with albumen.

**A Bolus** is sometimes ordered in a prescription, as 10 grs. of quinia may be prescribed by the physician with directions for the dispenser to make it into a "bolus," with honey, treacle, syrup, or any thick fluid. In England such a dose is sent out to the patient in one large, firm pill; but often in Ireland, and elsewhere, the pharmacist adds a sufficient quantity of the liquid substance to make a soft paste, like a confection or linctus, which he encloses in a piece of waxed or oiled paper, folded like a powder, with directions that it is to be scraped off with a spoon, and bolted or swallowed like jam. It is at the best an inelegant and often a disgusting form of administering medicine, the ordinary wafer paper offers a more manageable, sightly, and palatable way of taking powders. If the physician orders the powder or pill to be swallowed in wafer paper, the dispenser sends some of the wafers or discs made of flour and water, with directions that one is to be moistened, and the remedy wrapped up in it, and swallowed like a spoonful of soft food.

# CHAPTER VI.

## THE COMPOUNDING AND DISPENSING OF OINTMENTS AND SUPPOSITORIES.

THE making of an ointment is generally a very simple matter, only requiring perseverance and painstaking, which always repay the dispenser. It is often a matter of simple trituration; and a pestle and mortar, with a spatula, are all the implements required. Rarely, if ever, will the extemporaneous ointments ordered by the physician require any melting.

If two ointments, or an ointment and a liquid or oil, are ordered to be mixed, the simplest method of procedure is to weigh and measure the ingredients out on a porcelain slab, and thoroughly blend them with a long spatula. This will answer in many instances, but the dispenser is cautioned against making extracts, powders, or gritty substances into an ointment in this way.

In such cases the substance to be incorporated with the fatty or oily base is put into a mortar and ground with some minute quantity of excipient to the finest conceivable state of subdivision, and by far the best excipient ever devised is a little of the old-fashioned elbow grease. The pestle should be worked as shown in Fig. 6, and the mortar should be capable of holding very many times more of the ointment than is about to be made. When the powder, or extract, or crystal is put into it, it is subjected to firm powdering or rubbing. A very little of the fatty basis is added, and trituration continued till a smooth, impalpable paste is obtained; then the remainder of the basis is added gradually, sweeping the sides of the mortar and pestle from time to time with a spatula, so that all is thoroughly mixed. Often, however, it will be necessary to add something to facilitate the grinding before adding the ointment; thus, if camphor is ordered, it must be rubbed very fine by the aid of a little spirit which evaporates during the mixing. If an extract is to be added to an ointment it is first put into the mortar and rubbed to absolute smoothness with a little spirit, water, or glycerine before adding the unctuous base. If the extract is hard, or even of pilular consistence, the best plan is to previously warm the mortar by pouring hot water into it, and dry quickly with a cloth, when the extract can be rubbed to smoothness before a little grease is added. Soluble crystals like iodide of potassium, carbonate of potash, or soda, are triturated with a little water before adding the remaining ingredients. Iodine should be rubbed to powder, a few drops of spirit added, and the trituration continued. Iodide of sulphur should be most perseveringly rubbed down with a little olive oil, borax with a little glycerine, and red precipitate with distilled water.

Volatile liquids should be added after the other ingredients are well mixed, so that evaporation is reduced to a minimum, as in the case of prussic acid and chloroform.

Steel knives should not be used in the preparation of ointments with the alkaloids, or with acids, or especially with the acid nitrate of mercury, red precipitate, or yellow oxide of mercury ointments, which are ruined by the touch of iron. Many fine and pearly compounds made with cold cream are well prepared by mixing them up in a china cup with a silver or gilded spoon, and it is a safe rule for the young dispenser to always use a bone or boxwood knife in making all ointments.

This is not intended as a complete list of the difficulties and their remedies in ointment making; but the writer has deemed it wise to enter more fully into the subject than its simplicity might apparently warrant, for just because the preparation of this class of compounds appears to be very easy, so are they often carelessly compounded, to the vexation of the physician and annoyance of the patient. It is not at all an uncommon thing to see sores irritated and eyes inflamed by the very remedies prescribed to soothe them, the coarse angular particles acting like so many little setons. It is hardly necessary to say that any ointment with the least trace of rancidity should not be sent out by the dispenser.

When the mixing has been finished the ointment is scraped out of the mortar with a bone or wooden spatula, and generally dispensed in covered porcelain pots, and unless of very firm consistence a piece of waxed paper should be inserted between the ointment and the lid and pared neatly round. If it is at all approaching the fluid state a wide-mouthed bottle will be the best vessel. Occasionally, for the poor and in hospitals, the common chip box is used.

**Suppositories** are seldom ordered except in the Pharmacopœial form; but, as even these should be prepared by the dispenser himself, a passing notice should be made of their preparation. They are generally made in conical moulds, should weigh about 15 grains each, have cacao butter for their basis, and such other firmer substance, to enable them to solidify rapidly after being poured into the moulds; this latter *desideratum* is assisted by having the moulds in a massive metal block, which causes their rapid cooling. The ingredients should be treated as if an ointment was to be made; any powder or crystalline substance being rubbed to fineness with a little lard or a trace of the butter in a mortar or on a slab, whilst the remainder of it is being melted in a small cup on a water-bath with the wax; only enough heat should be used to barely melt them, and when they begin to show signs of congealing the triturated ingredients may be added with a teaspoon, and stirred constantly till a creamy mass is obtained, which is to be poured into the moulds with the teaspoon. If the moulds are previously dipped in ice water, or in a little freezing mixture, made by dissolving sal ammoniac in water, the subsequent detachment of the congealed substance will be expedited. This latter part often gives trouble, the suppositories persistingly adhering to the mould; various plans are tried, and the simplest would be to wet the interior of the mould with water, but water will generally run off it in drops; breathing into it often answers, or dusting over the surface with lycopodium and blowing out the excess; but by far the best method is to smear over the interior with soap liniment. Spermaceti will be found a more satisfactory addition to the cacao butter than wax, as, owing to the rapidity of its congealing, the mass is not so liable to adhere; oil applied to the interior of the moulds is liable to cause the suppositories to stick fast.

**Pessaries** are made in precisely the same way, only they are from six to ten times larger, generally weighing about two drams; and made in larger moulds of a similar shape. If a very small pessary is ordered it may be made as two suppositories fused at their bases, forming a double cone—and this shape answers well when it has to be moulded by the fingers.

Both suppositories and pessaries should be dispensed in small square cardboard boxes, with cotton-wool; or, in the absence of these, in large pill boxes; and the directions for their use should be plainly given by the physician, or written on the box—as sometimes in ignorance they are swallowed.

## CHAPTER VII.

### DISPENSING OF BLISTERS AND PLASTERS.

**Blisters** are generally spread upon adhesive plaster. In the case of public charitable institutions, they may be spread upon brown paper; but, unless directed otherwise, they should be always put upon the adhesive plaster, which is itself spread upon thin glazed calico, and kept in stock, in rolls of a yard each, by every dispenser. The twilled calico, swansdown, and other fabrics, as a rule, are not so suitable. The dispenser takes the size of the required blister, which is commonly oval or square, and prepares a "shape" by folding a square piece of waste writing or wrapping paper twice upon itself, and with a pair of scissors he cuts the form and size of the blister out of the middle of this, rejecting the cut out centre. (Fig. 14.)

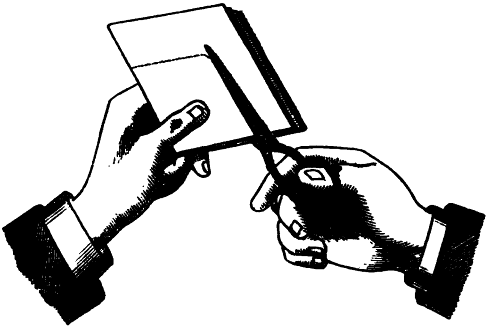

Fig. 14.

He has now an exact shape (Fig. 15), the inner margin or edge of which is the same size and form as the circumference of the required blister. (This is precisely the same manner in which plaster shapes are made.) A piece of the thin sheet of adhesive plaster is cut about one inch larger than the blister, and gently warmed, only enough heat being used to make it *slightly* sticky; it is then quickly laid upon some firm smooth surface, and the shape pressed upon the adhesive side—where it should evenly adhere, but only in such a way that it readily separates when pulled off. All is now ready for the spreading process, which should be accomplished by the thumb alone; the cantharides plaster of the Pharmacopœia is well adapted for this; a piece about the size required is worked up between the fingers until *uniformly* softened throughout, when the dispenser, steadying the shape and plaster with the fingers of his left hand, spreads a piece about the size of a bean with the side and front of the last joint of the right thumb, beginning at the corner next him and continuing in a series of rainbow strokes till the plaster is covered. This is well shown in Fig. 16.

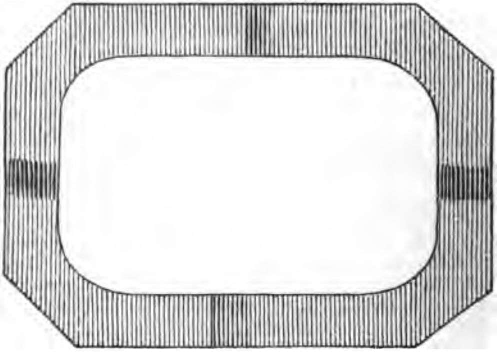

Fig. 15.

A long spatula, not unlike a dinner-knife, warmed only to such an extent that its temperature can be borne by the skin when pressed against the cheek, should now be firmly passed over the blister, removing superfluous plaster and making its

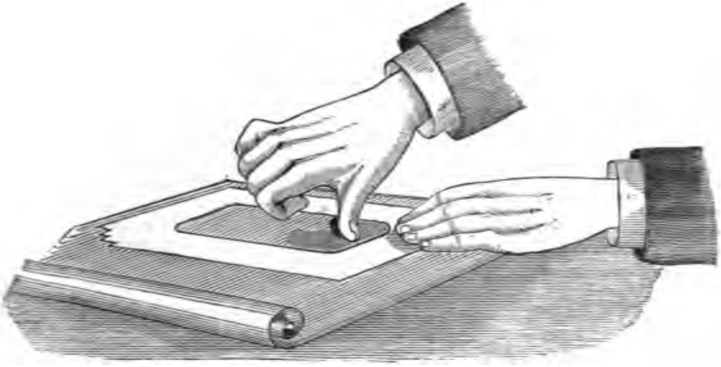

Fig. 16.

surface smooth and even. Some dispensers previously sprinkle a few drops of blistering liquid, or olive oil over it to improve its appearance—but this is not necessary. The paper shape is now peeled off the plaster and the edges trimmed neatly with a *large* pair of scissors, allowing a margin of plaster about three-eighths of an inch wide to remain; a piece of waxed or oiled paper* is laid on its surface, and the whole enclosed in a paper box or envelope. Instead of cutting the piece of plaster for the blister off the roll the experienced spreader may lay the shape on the roll itself, thus saving the clippings, as shown in the Figure.

**Plasters** are more difficult to spread, requiring heat, and are often liable to be burned, creased, or uneven; and the dispenser who can spread a plaster properly will be always found to be one who can perform every other duty of the compounding counter satisfactorily; hence it may be looked upon as the test of pharmaceutical accomplishment to be able to perform this operation neatly and excellently. Plasters are generally spread upon sheep skin or stiff chamois, and sometimes over adhesive plaster which has been already spread upon linen, dimity, or moleskin; but when the physician simply orders a plaster he means it to be dispensed on the white sheep skin which is kept by every dispenser. The same steps are gone through exactly in cutting the shape as if for making a blister; a piece of leather somewhat larger than the size of the intended plaster is cut off the skin, and pulled in different directions gently, to make sure that it will not yield too much when the weight of the iron goes on it; the leather is next laid on some soft even surface, a few quires of wrapping paper laid on the dispensing counter answer very well. The plaster iron, which should not be too large, is now *slightly* warmed over a gas stove or in the fire, wiped clean, and passed over the surface of the leather, so as to remove every wrinkle and inequality; the shape laid on the counter is moistened on one surface with a little damp tow or sponge. The addition of some soap to the water in which the sponge or tow is wetted is a practical point worth remembering, or a little flour paste may be employed. The shape is now placed upon the *rough* side of the leather, and pressed carefully and evenly with the palm of the hand near the wrist, until it adheres at every point to the leather, when it is ready for spreading.

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* The dispenser should be careful to direct this paper to be removed before application, as the writer has known several instances where blisters and plasters have been returned to the dispenser as useless, the paper never having been removed.

The different plasters are kept in cylindrical rolls, and are melted as required, by means of the plaster iron, on the heating of which the success of the operation depends; it should be warm enough to readily melt the plaster, without spoiling the leather; its heat may be judged by pressing it against a clipping from the sheep skin, which will brown and curl up if too hot.

When the plaster iron is well heated, a film forms on its surface, and often small particles of carbon adhere to it, which, coming off during the spreading, spoil the appearance of the plaster. To guard against this, the iron should be briskly rubbed against some soft solid substance, after coming out of the fire, as a piece of wood or coarse cloth. Irons are now made which can be heated by allowing gas jets to burn in their interior, and thus there is no limit to the amount of work which one iron can accomplish without interrupting the operation.

The iron then being heated to the right degree, its flat face

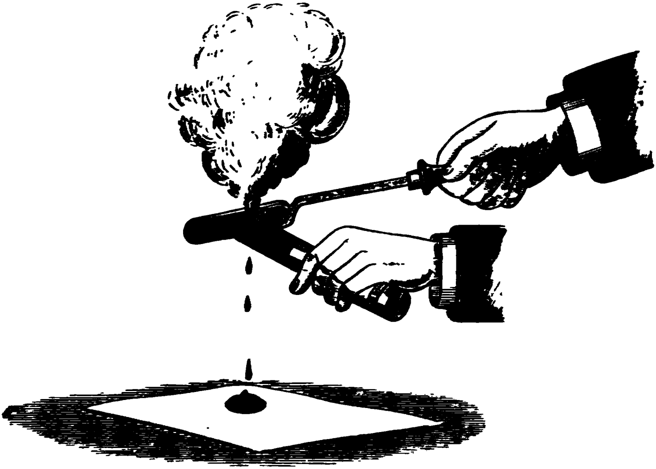

Fig. 17.

is pressed against the end of the roll of plaster with a slight circular movement, and the liquid plaster which drops down is caught upon a piece of strong, smooth brown paper, as shown in the Figure. If two or more varieties of plaster are ordered in combination, it is at this stage that they are melted together against the *face* of the iron, and mixed with its sharp *edge* on the paper; and, when a thoroughly uniform creamy mass is obtained, it is scraped along the surface of the paper t

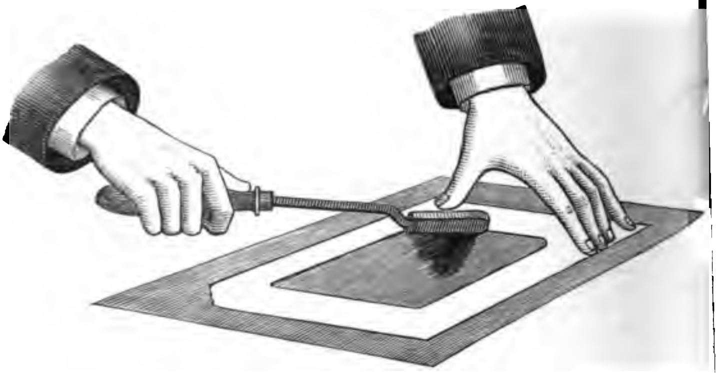

Fig. 18.

near its margin. The leather, with the shape attached, is now brought alongside, when a few strokes with the near edge and adjoining part of the face of the iron will spread the plaster over the surface of the leather, beginning at the edge next the operator and sweeping round the far margin in a series of half ovals; watching the borders and corners, for the centre will take care of itself. (Fig. 18.) Towards the end, when the leather is covered, the flat face of the iron may be used to smooth all irregularities; and, after a moment's delay, during which the plaster hardens, the shape may be pulled off, and the border of the leather trimmed; in a medium sized plaster at least three-quarters of an inch of border should be left. One iron will not do all this; and before beginning two should be selected; the second may come into use about the time the plaster is being transferred from the paper to the leather. If the plaster were melted directly on to the leather, as some advise, a mess would be the result.

Sometimes a plaster is ordered to be spread on leather with an *adhesive* margin, and it is a more troublesome process than the above. It may be done in this way:—The shape is cut as described, and the centre piece, instead of being thrown aside, is damped, and pressed against the middle of the leather; the shape is taken, folded up again, and a piece cut out of it for the entire extent of its inner margin—thus enlarging it by the width of the intended adhesive margin; it is then stuck to the leather, leaving a space between its inner margin and the central piece of paper, which space is to be spread over with adhesive plaster, both papers pulled off, and the vacant central part covered over with the plaster as ordered; the edge trimmed, the surface loosely covered with a piece of waxed paper, and dispensed in a flat paper box. The dispenser, until he has acquired great practice at spreading plasters, will be unable to finish the inside space without a shape; and he may achieve all that is required in this way:—The leather to be covered with plaster is laid down flat as before, and, with one good circular sweep of a large iron, its circumference is surrounded with a margin of adhesive or resin plaster; when this is cold, the shape, cut as before to the exact size of the plaster required, is laid down on the leather and attached, by means of a little soft soap, to the adhesive marginal surface. The plaster, having been mixed as previously directed on a separate bit of paper, is rapidly spread, as if there were no adhesive margin in the case, the shape is now torn off, and the adhesive border trimmed. The student will observe that if these directions are followed he will have no plain margin outside the adhesive one, and seldom is such deemed necessary, so that this latter method is, on the whole, the better one for him to learn.

## CHAPTER VIII.

### GENERAL HINTS TO THE DISPENSER.

In the small space at our disposal it is impossible to give more than a sample of the difficulties that beset the dispenser's path. The following few facts, it is hoped, will lead him to be on his guard, and meet many difficulties half way. It is hardly necessary here to remind the student of Pharmacy that upon his simplest manipulations hangs the life of the patient, and though this solemn sense of his responsibility should be ever before his mind, it should not be allowed to paralyse his exertions, or tend to render him "unpractical." Over-confidence is a fruitful source of mistakes in Pharmacy, as it is in other departments, and the pharmacist must be cautioned against falling into the habit of working mechanically or automatically, so common amongst the absent-minded. It is a frequent occurrence, for example, to see a dispenser walk in an automatic way up to a well remembered place where a bottle has always stood, lift it from its shelf, and pour out its contents without looking at the label. If the student should find himself falling into this habit, his remedy is to occasionally remove the bottles and occupy their places with others, evidently different.

As quickness and despatch are generally considerations in Pharmacy, it is advisable to keep some of the more frequently prescribed salts in solution; and a few hints as to the most convenient strengths of these solutions may not be out of place here. Bicarbonate of potash 1 ounce (Troy), dissolved in enough distilled water to measure 4 ounces, makes a very suitable stock solution, as half an ounce of it contains one dram, or 60 grs., of the salt. Chlorate of potash, 1 in 24, made in the same way, is the best strength to suit all variations of temperature. The salt is soluble in a smaller quantity of water, but is apt to crystallise with changes of temperature. Epsom salt, 1 in 2; bromide of potassium, 1 in 3; and chloral hydrate, 1 in 1; make very convenient solutions, the latter particularly so, as each minim represents one grain of chloral, and it is stable and easily calculated.

Some of the official pill masses become very hard on keeping, and get so brittle as to be unmanageable; they may, with great advantage, be kept in the dry state, the powdered ingredients being mixed together, so that the menstruum ordered by the Pharmacopœia to give consistence may be added at the time of dispensing. In this way Pil. Colocy. Co., Pil. Aloes Barb., and Socot., Pil. Aloes et Ferri, and Pil. Plummeri may be kept with the required proportions of the requisite menstruum marked on the bottles in which they are contained. This plan is often a great help if the physician happens to order too soft a mass.

Mistura Ferri Co. can also be kept in a concentrated form, so that every dram will contain the constituents of an ounce of the mixture, except the sulphate of iron, which is to be weighed out and added the last thing before dispensing. Mist. Cretæ can be easily kept in powder, ready for the addition of cinnamon water.

The use of concentrated infusions and decoctions, so often employed by pharmacists, is to be condemned. *These preparations should be always made fresh as required.* It cannot be to strongly impressed upon the student's mind that substitution should never be practised. By substitution is meant the using of an equivalent quantity of one preparation of a drug for that of another, say for instance, infusion of cinchona is required, it would be absolutely wrong to use an equivalent quantity of the liquid extract, as it has been conclusively proved that this latter preparation does not contain anything like the quantity of alkaloids that an equivalent quantity of bark in the infusion does. The knowledge of such a practice having been common formerly in some places induces the writer to caution the student of Pharmacy, at the beginning of his career, never to depart from the strict observance of the Pharmacopœia.

Often the dispenser will be at a loss to understand the meaning of the prescriber, when he orders some preparations out of their official names, and he then must have a consultation, or fall back upon the experience of himself or others. A few examples may be given—When Magnes. Calc. is ordered, Magnesia B.P. should be used; when Magnes. Carb., the *heavy* preparation is usually intended; when Bismuth, or Bismuth Alb. is prescribed, the subnitrate is the preparation generally in the mind of the physician; when Aqua Menth. is ordered, Aq. Menth. Pip. should not be used, but Aq. Menth. Sativ. is the intention of the prescriber.

Liq. Morphiæ is very often written in a prescription, and the dispenser will do well to always employ Liq. Morph. Mur. When Extract. Aloes is written, the rule should be to use the Socotrine.

Much confusion unfortunately exists in the memory of some prescribers about the mercurial chlorides, and fatal consequences have resulted. The Subchloride is often written Hyd. Chlor., Hyd. Mur., Hyd. Submur., and the Perchloride is occasionally prescribed as Hyd. Chlor., or Hyd. Bichlor.

If the dispenser find it impossible to consult the physician in such cases, he will not regret giving the subchloride, if more than ¼ grain is ordered in each dose.

When the physician orders salts, like Pot. Iod., or roots, like Gentian, with directions for their solution or infusion by the patient himself, the dispenser should destroy their identity by the pestle, before sending them out. Quinine, for the same reason, if ordered in a mixture without a solvent, should be carefully triturated till the crystals are broken up.

When the pharmacist gets a prescription where incompatible substances are ordered it is clearly his duty to compound it, unless *absolutely* incompatible, in which case the different ingredients will not mix, and, if possible, then he should consult the prescriber. Instances of such might be given to fill a large volume, and, unfortunately, no rule can be laid down for the guidance of the young dispenser, as it is still an open question with pharmaceutical authorities whether a compounder is justified in altering a prescription, suppose he find the emulsifier or pill excipient ordered by a medical man unsuitable. Much will depend upon his knowledge of, and his relations to, the prescriber; but where a consultation is impracticable, the dispenser must rely upon his past experience.

Perhaps the greatest difficulty will be met with in the case of pills. A commonly ordered pill is one containing 2½ grs. of sulphate of iron, and 2½ grs. carbonate of potash. Any liquid added to this would promote decomposition, and experience proves that a little vaseline and cacao butter make an excellent excipient. Iodide of potassium is often ordered in pills, and may be made up by rubbing the salt with a few drops of water into a stiff smooth paste, and working it into a good mass by the addition of a little liquorice powder; in this way 6 grs. may be easily got into a fair sized pill. The proportions of water and liquorice are not given, as they entirely depend upon the samples of iodide, which vary considerably in their suitability for making pill masses.

Phosphorus is occasionally ordered to be made into a pill, *secundum artem*, that is, in whatever way the dispenser thinks best. It should be dissolved in bisulphide of carbon, and whilst solution is being effected 2 or 3 drops of chloroform may be added, which produce a heavy vapour around the solution, and prevent oxidation of the phosphorus by the atmospheric oxygen. A little liquorice powder may now be added, and the mass quickly made into a workable form with the tragacanth paste (described on page 27), divided into pills, and coated.

Carbolic Acid (Calvert's pure crystalline) may be easily made into pills with wheaten flour, in the proportions of 1½ grs. flour to 2 grs. of acid.

Permanganate of potash can be made into pills with cacao butter.

Camphor, after being powdered with a few drops of spirit, makes a nice mass with tragacanth paste. 3 grs. of powdered acetate of potash may be made into a suitable pill with Canada balsam, and will remain stable.

Powdered Pill, or Extract of Colocynth, may be easily worked into a mass with a few drops of decoction of aloes.

Croton Chloral should not be treated with the tragacanth paste, which dissolves it, and causes the pills so made to flatten. It is best worked up with a little confection of hips and *thick* mucilage.

Sulphide of Calcium, now much ordered for acne, should be mixed with an equal quantity of sugar of milk, and, after careful trituration, as much powdered decorticated liquorice root added as will make the weight up to say a grain, or more. The mass can now be easily worked up with a little tragacanth paste. Sugar of milk makes the best powder to aid the subdivision of an active substance, and the powdered decorticated root of liquorice is the best inert powder for making up pill masses, as it is so fine and impalpable that it does not make a crumbly pill like powdered gentian.

Citrate of iron and quinine makes a good pill with the tragacanth paste, but it will not remain hard as the salt is deliquescent.

Copaiba can be made into firm pills which keep their shape by adding a very small quantity of carbonate of magnesia to it. Powdered rhubarb makes a good mass with ⅕ its weight of glycerine. Gallic acid 5 grs. and glycerine ½ a drop, make a good pill. Four parts of quinine and one of tartaric acid, with q.s. of tragacanth paste, make a very excellent mass.

Chlorate of Potash and Hypophosphite of Lime, rubbed together, explode, and may cause injury to the dispenser.

Creasote, if ordered with oxide of silver in a pill, will explode unless the oxide be first diluted by trituration with some inert powder like liquorice or gentian, before adding the creasote.

Borax, powdered and rubbed up with mucilage, forms a soft powder like moist sugar, which cannot be made liquid by the addition of any further quantity of mucilage; and acetate of lead, similarly treated, makes an opaque white jelly.

Spirit of Nitre will generally require to be neutralised with bicarbonate of potash, before being compounded with bromide or iodide of potassium, otherwise free Br or I will be liberated, and the mixture darkened.

Subnitrate of Bismuth is often ordered in a mixture with bicarbonate of soda, and unless very great care is taken in compounding them, by permitting decomposition at a gentle heat, carbon dioxide will be produced, and the bottle will burst. This may be prevented by using an equivalent quantity of the carbonate of bismuth.

**When emulsions are ordered in a prescription, with the emulsifying agent left to the discretion of the dispenser, he will get some hints in Chapter III., or he may refer to Gerrard's valuable contribution in the Year Book of Pharmacy, 1880.**

**Pessaries and suppositories, containing green extracts, may be readily made by first rubbing the extract with powdered Castile soap to about one-fifth part of the bulk of the whole pessary or suppository, and supplying the remainder of the basis with coccine, when the mass can be worked up like a pill in a mortar, and shaped by the fingers or thrust into moulds previously dusted with powdered starch.**

**Chloral Hydrate can be made into a suppository by digesting it on a water bath in cacao butter, in which it is soluble.**

**In conclusion, it may be mentioned that where a prescription is repeatedly compounded, the patient often asks for the dose to be increased, or some other change to be made, and the dispenser is warned not to accede to such a request, no matter how simple it may appear, without a consultation with the prescriber; nor is it advisable for him to inform the patient (even when pressed) of the ingredients in any prescription. He can refer them to the physician, or do as the writer has done long ago, when it was impossible to avoid such a revelation—read it in full Latin to the patient. It need hardly be mentioned that in the case of repetitions of medicines of all kinds they should *invariably* be dispensed in fresh bottles or vessels, and have new labels attached in every instance, though the old ones may seem scarcely soiled. Breach of this law is certain to soon get the dispenser into disrepute.**

## CHAPTER IX.

### OFFICIAL PHARMACY.

**UNDER this heading are included brief descriptions of various processes mentioned in the directions for the preparation of several Pharmacopœial remedies. Many other processes are used by the pharmacist, but only the most important of those referred to directly in the last edition of the British Pharma-**

copœia will be noticed. The student will probably discover that many of these are but repetitions of processes already practised by him in the chemical laboratory—as precipitation, crystallisation, &c.; others, however, will be found to be peculiar to Pharmacy—as percolation, infusion, &c.; and it will be advisable for him, before entering upon the study of the various preparations also included under this heading, to glance at a few of these more important processes—especially to those that are common to many groups of preparations, as—

**Affusion or Ablution**—by which is meant the pouring of water upon any substance to cleanse it of its impurities. In the washing of a precipitate, for example, the student is directed to pour cold or hot water upon it, shake or stir briskly, allow the insoluble part to fall to the bottom by rest, and then to pour or draw off the supernatant liquid. In the British Pharmacopœia these simple operations are respectively dignified by the names of

AFFUSION,
AGITATION,
SUBSIDENCE OR DEPOSITION, and
DECANTATION.

**Analysis**—In the Pharmacopœia both the *qualitative* and *quantitative* methods are frequently directed to be employed; and of the latter sometimes the *volumetric*, and sometimes the *gravimetric* process is made use of.—(See "Testing.")

**Baths**—Sand, water, and steam are mentioned under Fusion.

**Boiling or Decoction** is largely employed in the manufacture of various decoctions, extracts, syrups, &c. Generally the directions are, that the article to be decocted is to be put into a covered vessel with cold water, and allowed to boil on the fire for a given time. If say a quart of water, with the substance in it, is to be boiled down to a given quantity, as a pint, then the decoction is a mixed method of boiling and concentrating by evaporation, and an uncovered vessel is selected; decoction of pomegranate is made in this way. The process of making extracts is quite different; here the evaporation or boiling is performed after the drug is separated from the original decoction, juice, or infusion. **Ebullition** is the ordinary chemical term for boiling, and is occasioned by the formation of bubbles of vapour within the liquid, which rise to the surface like gas bubbles. Decoction, strictly speaking, is the ebullition of a liquid containing some vegetable substance whose virtues are to be extracted by the boiling liquid.

**Bruising or Contusion** is a process by which soft, elastic, or ligneous substances have their structure broken up before being subjected to the action of a solvent by infusion or maceration. It is employed to break down the cohesion of fibrous roots, and is applicable to all tough drugs, like ergot, cloves, assafœtida, &c., and to fresh leaves and young juicy branches. The article to be bruised is put into an iron or strong stone mortar, and, with a straight up and down movement of the pestle, it is bruised, crushed, or pounded till the requisite degree of destruction of tissue is obtained; a little only being operated on at a time. The same object is often attained by cutting.

**Calcination or Incineration** is the process of exposing a substance to a high heat, so that water and volatile matters are driven off, or oxygen absorbed, and the residue left in a finely divided powdery condition. The process is carried on by placing the substance to be calcined in a Cornish, Hessian, or other crucible, which is placed in a furnace. In this manner the Pharmacopœia directs magnesia and lime to be prepared from their carbonates.

**Clarification or Depuration** is the purification of a substance, generally a liquid or semi-solid, by extracting its impurities, as in the case of honey, lard, suet, &c., by melting or heating, and, whilst fluid, straining through some texture like flannel. It is a modification of the process of filtration.

**Crystallisation** is the process which bodies undergo in passing from the liquid or gaseous state to assume definite and regular geometrical forms called crystals. This process is generally directed to be carried out by the cooling or evaporation of a solution containing the substance to be crystallised, or more rarely it is ordered to be effected by fusion, as in the case of some metals and sulphur; by sublimation, as benzoic acid and corrosive sublimate; or by precipitation, as in the instance of the red iodide of mercury. In obtaining crystals by evaporation the liquid is either boiled till its volume is reduced by the loss of vapour, or it may be kept at a lower temperature than the boiling point for a longer time till the same effect is produced, and when the concentration has proceeded so far that a scum or pellicle forms on its surface, the liquid is set aside to cool, and as the temperature falls crystals form. When they have ceased to grow or increase, the fluid part, which is now called the "mother liquor," is poured off, and the crystals drained and dried. A second or third crop may be obtained from the mother liquor by further evaporation and cooling, as in the first instance. The process is hastened by the presence of foreign bodies, as threads or sticks, round which the crystals quickly gather, or by agitation, when the crystals will be found to be small. The slower the process the larger and more regular will be the crystals, and it is advisable not to evaporate just so far as the Pharmacopœia directs usually for most of its salts. The six systems of crystals are all well represented in the Pharmacopœia.

In the case of some salts, like alum, carbonate of soda, and sulphate of iron, the water of crystallisation, which the salt carries down with it on assuming the solid form, is directed to be expelled by heat, thus increasing the strength of the substance by the weight of the water lost, which ranges generally from ¼ to ¾ of the original salt; thus dried sulphate of iron is about twice the strength of the crystals.

**Decoloration**—A process by which substances like the alkaloids Morphia, Atropia, &c., are deprived of colour—consists in treating a solution or mixture of the substance with powdered charcoal and filtering. Purified animal charcoal is directed to be used.

**Despumation** is the name given to the process by which many organic liquids are purified by the application of heat, when the impurity rises to the top as a scum, and is easily removed by skimming or by filtration. Though not directly mentioned under this name in the Pharmacopœia, this process is extensively employed, as in the making of the green extracts, and the practical pharmacist finds that syrups made with organic liquids, like the majority of the official ones, keep much longer by being despumated. This is the more necessary, as it is difficult to find sugar perfectly pure and free from organic adulteration.

**Desiccation** is the name given to the process of drying drugs.—(See under "Drying.")

**Digestion** is one of several allied processes often confounded. It means the prolonged treating, at a heat elevated, but below the boiling point, of a substance (such as a powdered root) in the liquid intended to dissolve out its soluble principles. It is the same as maceration at a higher temperature than that of the air.

**Distillation** is the process by which a liquid is converted into a vapour on the application of heat, and the vapour is condensed into a liquid again in a separate vessel. The variety of apparatus for the process is endless. The simplest would consist of a closed vessel called a retort, from the top of which a long tube leads to a receiver. On partially filling such a vessel with a volatile liquid, and applying heat, till boiling, the vapour of the liquid would fill the upper part of the vessel and tube, during its passage through which it would be cooled or condensed, and drop into the cold receiver as liquid. The object of distillation is to combine volatile substances which cannot otherwise be mixed, as in the preparation of the waters, or to separate mixed volatile and fixed substances, as in making Spt. Ammon. Fœtid, or to separate impurities from the liquid which could not be got rid of otherwise. Distillation is a mixed process, consisting of ebullition—by which, in the first instance, the volatile substance is converted into vapour—and of condensation, by which the vapour is again changed into a liquid.

**Destructive or Dry Distillation** is the process by which a body is decomposed by heat into volatile products which did not previously exist in it, the products being collected in a separate vessel, as in the production of acetic acid and tar from wood.

**Fractional Distillation** means the distilling of a mixture of substances volatile at different temperatures, whereby they may be separated and received into different vessels by regulating the temperature.

**Drying** is a process used in the preparation of a great many remedies. There are, however, no official directions given for the drying of roots, leaves, seeds, &c.; these are generally submitted to a uniform temperature in a room, heated by steam or hot water pipes, after being spread out on shallow trays or drawers of network. The best heat is one ranging between 100° and 130° F. Many plants which are used in Pharmacy are dried simply by exposure to the sunshine of their native country, but this is not practicable in our latitude. Flowers should be allowed to dry spontaneously. Fleshy roots should be transversely sliced before being placed in the drying room. Crystals and precipitates, as a rule, stand higher temperatures, and may be dried on a water-bath. Others require still higher temperatures, especially when we aim at the expulsion of the water of crystallisation, as in drying alum and sulphate of iron—where a heat of 400° is required. On the other hand some salts, like the valerianate of zinc, must be dried at the ordinary heat of the surrounding atmosphere. Carbonate of potash and slaked lime recently heated are used to absorb the water from alcohol, freshly burned lime from ether, whilst sulphuric acid is used in various drying processes.

**Elutriation**—The process of powdering rough insoluble substances like chalk, ores, &c., and mixing them with water, so that the finer, light, powdery portion may be poured off after the coarser particles have fallen to the bottom. It is done sometimes merely to wash away such impurities as sand, gravel, &c.; in its results it resembles sifting.

**Expression** is the process by which the juice or oil is squeezed out from vegetable substances, and the tincture or spirit from the marc after maceration or percolation. It is performed by putting the substance into a suitable press, and by mechanical power separating the solid from the liquid portions. Oils so obtained are called expressed or fixed oils, to distinguish them from volatile or distilled oils.

**Evaporation** is the process by which the volume of a liquid is reduced and its volatile constituents driven off by a heat ranging between that of the air and the boiling point of the liquid. It is employed in the making of extracts, in the crystallisation of salts, and many other operations in Pharmacy. The vessels used should be very shallow, and present a large surface of the liquid exposed to the air. In evaporating vegetable juices and infusions, a moderate heat should be employed —say about 140°F. The nearer the liquid is kept to the boiling point the quicker the evaporation ; and small quantities only of vegetable infusions or juices should be subjected to the process, and in separate batches, which can be evaporated down still further if necessary—thus preventing deterioration by long heating. Stirring quickens the process, and the heat may be regulated by the use of a water, steam, or sand-bath. —(For which see "Fusion.")

**Filtration** is a process by which we separate an insoluble matter or sediment from a liquid, by causing it to flow through the pores of blotting paper, flannel, felt, calico, or linen ; the liquid after passing through being clear and bright. *Straining* is a quicker, but rougher, process of the same nature, for the removal generally of *visible* foreign particles, by causing the liquid containing them to pass through the open meshes of muslin, tow, wool, asbestos, or wire netting. If a liquid is *perfectly* transparent, and offers no obstacle to the passage of light, it is said to be "bright," though it may be highly coloured. All tinctures should possess this quality ; and if they do not, repeated filtration, with rest, will brighten them. In the case of very dark liquids, they should also be bright when examined in *minute* quantity by transmitted light. Opposed to this condition we have that of "muddiness," which is oft an opprobrium to the pharmacist; it is caused by the presence of *invisible* particles in a state of suspension, producing translucency. A mixture or liquid is said to be "clear" when no *visible* particles of foreign matter are detected in it; hence a liquid may be bright, but not clear, if it contain a few coarse particles floating through it and is otherwise transparent. The treatment for muddiness or opalescence is Filtration; for want of clearness, *Straining* is the remedy.

**Fusion, Liquefaction, or Melting,** is the process by which solid bodies are rendered liquid by the application of heat; it is largely employed in making ointments, plasters, caustic sticks, and in purifying resins, and for the purpose of decomposition—as in making Potassæ Permang. The substances are put into a suitable vessel and heat applied, varying from a temperature of 90°, sufficient to melt lard in an open jar, to one of 800° for fusing zinc in an earthen crucible. The water, steam, and sand-baths are frequently employed. The *water-bath*, as described in the preface to the Pharmacopœia, consists "of an apparatus by means of which water, or its vapour, at a temperature not exceeding 212°, is applied to the outer surface of a vessel containing the substance to be heated." In the *steam-bath*, the vapour of water at a temperature above 212°, but not exceeding 230°, is similarily applied; and in the *sand-bath*, a vessel, partially filled with fine sand, is placed upon the top of a stove or on the open fire, and the substance to be heated in a jar or crucible is thrust down into the sand; it differs from the steam and water-bath in not limiting the heat to any extent, and is no safeguard against any high temperature being reached; but it effectually prevents sudden changes in the heat, keeping the substance by a little watching at a uniform degree. Since alkalies and oxide of lead attack silicious substances, for them iron or silver crucibles must be used. Platinum also is attacked by alkalies, though very feebly.

**Gathering of Plants, &c.,** should be effected, when possible, in sunny weather, and at the time specified in any particular case in the Pharmacopœia. Generally, roots of annual plants should be dug up *before* flowering; and perennial roots should be gathered in winter or very early spring, as soon as the first leaves show themselves above ground, and not till the plants are two or three years old at least. Rhubarb should be six years of age. Leaves should be gathered before they begin to change colour, and those of biennial plants not till the second year—as hyoscyamus, for example, collected in the first year of its life, is almost inert; some are directed to be gathered when the plant has two-thirds of its flowers expanded, others when the fruit begins to form.

Barks should be collected when they come off most readily from the wood—*i.e.*, from trees in the spring, and from shrubs in the autumn. Flowers should be gathered when about four-fifths expanded; the red rose, however, is collected in bud, otherwise it looses its astringency and colour; and the flower-buds of the clove are almost devoid of aroma when fully expanded. Fruits and seeds, generally, are collected when ripe; but the pimento, pepper, bael, and others, are exceptions.

**Granulation** is the process by which a coarsely crystalline salt is reduced to the condition of a granular powder, by dissolving it in water and evaporating the solution—incessantly stirring till the product becomes dry. Carbonate and citrate of potash are thus made, and sometimes substances which can scarcely be reduced to powder otherwise are treated in this way, such as sal ammoniac and nitre. Sulphate of iron is granulated by filtering a solution of it into rectified spirit, which is to be kept constantly stirred, so that the crystals will be very minute.

**Infusion** is the process of extracting from a body, commonly of vegetable origin, its virtues, or soluble parts, by treating it for a short time with water in a covered vessel, the substance being first reduced to a state of moderate subdivision or coarse powder; generally water in the act of boiling is used. Sometimes, as in the case of cusparia and chiretta, water at a lower temperature is ordered, and cold water is used to extract the virtues of calumba, in order to avoid dissolving the starch contained in it. Quassia yields up its bitter principles to cold water. As a rule, the subdivision of the substance need not be carried to the same extent as for tinctures.

**Levigation** is the name given to a process like elutriation, in which an insoluble substance is *ground* into powder in presence of water or some liquid in which it is insoluble, the finer parts washed away and collected, the coarser being returned for further grinding with water, and so on till a fine powder is obtained. Red precipitate is thus reduced. Elutriation is applicable to cheap, coarse materials, like chalk and ores, where the refuse is not reground but rejected.

**Lixiviation**—The process of acting upon a compound or mixed solid with water, in order to dissolve out a soluble salt, the solution being poured off the insoluble residue and evaporated, as is done in the preparation of pearl-ash from wood-ashes, and gallic acid from galls.

**Maceration** is the process of steeping or soaking, at the ordinary temperature of the atmosphere, a substance in a liquid capable of dissolving some of its soluble constituents. The liquid is called the *menstruum*, and the rejected matter, which is insoluble, is spoken of as the *marc*. Several tinctures are directed to be prepared in this way. It differs from digestion in being carried on generally for a much longer time, and without heat, and spirit is commonly the menstruum. The drug should be previously reduced to a proper state of comminution by bruising, cutting, or powdering. Frequent agitation is a necessary part of the process, which may be carried on in any wide-mouthed bottle.

**Percolation or Displacement** is one of the most important processes in Pharmacy, being extensively used in the preparation of tinctures. It consists in packing into a short wide tube, closed at one end by tying a piece of calico over it, the substance, in a state of coarse powder, whose virtues are desired to be extracted, and pouring into the tube the menstruum—generally proof spirit. As the spirit filters its way through the column of powder, it dissolves out the soluble parts and drops finally into the receiver below as a bright tincture. The process may thus be defined to be "the filtration of a liquid through a porous column of a powdered material, so that it may extract its soluble matter." It is not adapted to gummy or adhesive substances, and possesses the great advantages over maceration in being quicker, and in the fact that after the fluid has ceased to drop, the tincture still left in the tube can be displaced by pouring in more spirit or water on the top of the marc. The mixed form of first macerating and then percolating, which is generally directed for the manufacture of tinctures, is decidedly better than either process used separately. At the bottom of the tube, immediately over the calico, a layer of fine pebbles

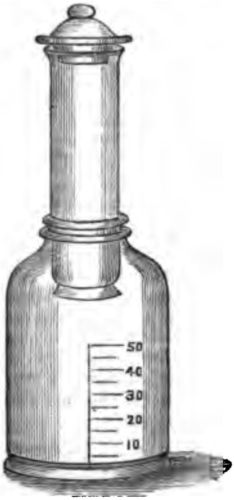

Fig. 19.

or coarse river sand prevents the powder closing its pores. [Fig. 19 represents the most suitable form of apparatus.]

Great skill is required in carrying out the process of percolation, and much depends upon the degree of comminution which the substance receives. If the powder be too fine, it gets into a cake, and prevents the passage of the spirit; and if tóo coarse, the spirit runs between the particles without dissolving out their active properties, flowing in little channels through the tube into the receiver. A good deal, also, depends upon the way in which the powder is packed into the tube, and experience only will give an idea of the uniform tightness and pressure required to be used. A heavy, round, ebony ruler makes a good ram for packing in the powder.

**Pulverisation** is the process of reducing solids to powder. The barks, roots, leaves, stems, and fruits of trees and vegetables are first thoroughly dried and afterwards ground in a mill, of which there are many kinds. Leaves lose as much as 80 per cent. of their weight by drying and powdering; the powder often gaining greatly in strength over the fresh leaves. Substances are reduced to the coarse powdered state necessary for infusion and percolation just as they are required, by bruising in an iron mortar, operating only on small quantities at once. Salts and crystals may be reduced to powder in small quantities in a wedgewood mortar, by grinding or trituration, and sifting through muslin or fine metallic netting, the portion not going through the sieve being returned to the mortar, and the operation being repeated till the requisite fineness is obtained. Camphor can only be powdered by adding about the fourth of its weight of spirit, and triturating it to dryness. Spermaceti, in like manner, by adding a little spirit, may be easily reduced to powder, and tragacanth is best powdered warm. Some substances must be powdered and rubbed with water—"Levigation"—others by granulation, as zinc and tin; and iron, by filing or reducing with hydrogen. The powder differs from the vegetable drug of the same name, by having less water, essential oil, or volatile constituents, less woody fibre, and in being generally more active—powdered opium being one-eighth part at least more active than the fresh drug. The use of the mortar and pestle is fully described under "Mixing" and "Pill Making."

**Precipitation** in Pharmacy, as in the laboratory, is the process by which we get a substance deposited from a solution, either by adding a second liquid in which it is insoluble, as in pouring water into spirits of camphor, or by mixing two solutions of different salts which combine and form an insoluble compound—as in mixing solutions of perchloride of mercury and iodide of potassium together, the iodide of mercury being thrown down as an insoluble crystalline powder, which is washed by the process of affusion.

**Sifting** is the process of separating the coarser from the finer particles of pulverised substances, and is generally performed by pressing them through the meshes of fine wire, horse-hair, or muslin sieves. The Pharmacopœia gives no directions for the size of the meshes, but patent sieves of different degrees of fineness are now prepared, with which instructions are given for their respective uses. When fruits, like prunes, tamarinds, or figs, are ordered to be sifted, the operation is called " Pulping;" here considerable force must be employed to press the finer particles through, which, in the case of dry powders, are allowed to drop through by their own weight.

**Solution**—The condition of a substance dissolved in a liquid is a state difficult to define. Most of the instances of solution in Pharmacy are *simple*, as the solution of sugar in syrup, in which case the sugar is found unaltered on evaporation; others as in the saccharated solution of lime, in which the substance is in a state of *chemical* solution, and cannot be recovered unaltered on evaporating. Others again are more difficult still to define, as the solution of one liquid in another, or of a gas in a liquid. The process of solution, with very few exceptions, is quickened by heating the solvent, and, having the substance to be dissolved in fine division. Both these advantages are gained by the ordinary method of rubbing the substance in a mortar, with hot water. When the hot solvent ceases to dissolve any more of the substance, the solution is said to be saturated, and, on cooling, will always deposit some of the salt in crystals, the liquid, when cold, being called a cold saturated solution.

**Sublimation** is the process by which a solid is reduced by heat to the state of a vapour, which is condensed and deposited on the surface of another vessel, either in masses, when it is called a *sublimate*, like arsenic; or in a feathery pulverulent state called *flowers*, as in the preparation of sulphur. Sometimes this process is improperly called dry distillation.

**Testing**—The British Pharmacopœia, to ensure the purity and identity of its different preparations, directs, in every convenient case, certain tests; thus the ordinary *Qualitative analysis* is employed frequently. Take, for example, the first fluid preparation, "Acetum." The student is directed to try the effects of sulphuretted hydrogen—if lead be present it is discoloured—but, it is necessary to prove also that it contains the requisite percentage of acetic acid by *Quantitative* analysis, and the *Volumetric* method, which estimates the quantity by *measuring* the volume of the reagent necessary to produce the change, and afterwards calculating the weight used; and he is informed that one fluid ounce (445·4 grains) of vinegar is neutralized by 402 grain-measures of the volumetric solution of soda, which is found to correspond to 4·6 per cent. of the anhydrous acetic acid. In testing the strength of dilute phosphoric acid, a different system — the *Gravimetric* — is directed. A given weight of this acid is poured upon a known weight of oxide of lead, and phosphate of lead is formed. This, after being dried, is weighed—the increase in weight of this giving the amount of phosphoric anhydride present. Complete volatilisation is the test used for several salts, as those of mercury.

**Trituration** is the process of reducing solid substances to the state of powder by continued rubbing. Generally, in Pharmacy, the operation is conducted in a wedgewood mortar. (See under "Dispensing of Mixtures" and "Pills.")

## CHAPTER X.

### PHARMACOPŒIAL PREPARATIONS.*

The student, having obtained some idea of the foregoing general processes of Pharmacy, should now glance at the groups of the preparations; but, until he has mastered the Materia Medica section, he cannot expect to grasp all the information contained in this part of the subject; and hence, since these groups are of vital importance, he should repeatedly turn back to them during his study of the Materia Medica.

**The Aceta or Vinegars** of the Pharmacopœia are three in number:—

**Acetum** (Vinegar) contains 4·6 per cent. anhydrous acetic acid.
**Acetum Cantharidis**—2 oz. cantharides, 2 oz. glacial acetic, and 18 oz. acetic acid.
**Acetum Scillæ**—2½ oz. squills to 1 pint dilute acetic acid, and 1½ oz. proof spirit.

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* These preparations are often called "Galenical" *(pertaining to Galen)* to distinguish them from those prepared from the extemporaneous formulæ of the physician, which are called "Magistral" *(because ordered by a magister or master of his profession).*

It will thus be noticed that the first is simply vinegar, the second a solution of cantharidine, in *strong* acetic acid, and the third a tincture of squills, made with *dilute* acetic acid.

**Aquæ** (The Waters—Fifteen in number), viz.:—

**Aqua**—Pure natural water; filtered (if necessary).
**Aqua Anethi**—One gal. distilled from 1 lb. fruit and 2 gals. water.
**Aqua Aurantii Floris**—The water distilled from the fresh flowers in France.
**Aqua Camphoræ**—A solution of camphor in water, about ½ gr. in 1 oz.
**Aqua Carui**—One gal. distilled from 1 lb. of fruit and 2 gals. of water.
**Aqua Chloroformi**—A solution of 1 dr. chloroform in 25 oz. water.
**Aqua Cinnamomi**—One gal. distilled from 1¼ lb. of bark and 2 gals. water.
**Aqua Destillata**—Perfectly pure, $H_2O$ distilled in a copper still.
**Aqua Fœniculi**—One gal. distilled from 1 lb. of fruit and 2 gals. of water.
**Aqua Laurocerasi**—One pt. distilled from 1 lb. of leaves and 2½ pts. water.
**Aqua Menthæ Piperitæ**—One gal. distilled from 1½ dr. oil and 1½ gal. water.
**Aqua Menthæ Viridis**—One gal. distilled from 1½ dr. oil and 1½ gal. water.
**Aqua Pimentæ**—One gal. distilled from 14 oz. pimento and 2 gals. water.
**Aqua Rosæ**—One gal. distilled from 10 lbs. fresh petals and 2 gals water.
**Aqua Sambuci**—One gal. distilled from 10 lbs. fresh flowers and 2 gals. water.

It should be remembered that all the waters are distilled except three—Aqua, Aqua Camphoræ, and Aqua Chloroformi, and that their doses all range from ½ to 1 or 2 oz., except Aqua Laurocerasi, which contains prussic acid, and whose dose is only 5 to 30 minims.

**Cataplasmata** (Poultices—Six in number)—

**Carbonis**—Wood charcoal ½ oz., bread crumb 2 oz., linseed meal 1½ oz., boiling water 10 oz.—1 in 28.
**Conii**—Hemlock leaf 1 oz., linseed meal 3 oz., boiling water 10 oz.—1 in 14.
**Fermenti**—Beer yeast 6 oz., wheaten flour 14 oz., water at 100° 6 oz.—1 in 4½.
**Lini**-Linseed meal 4 oz., olive oil ½ oz., boiling water 10 oz.—1 in 3½ (nearly).
**Sinapis**—Mustard 2½ oz., linseed meal 2½ oz., boiling water 10 oz.—1 in 6.
**Sodæ Chloratæ**—Solution of chlorinated soda 2 oz., linseed meal 4 oz., boiling water 8 oz.—1 in 7.

Of the six poultices, all are made with linseed meal for the basis, corpús, or body, as it is called, except the yeast poultice, and in all boiling water is used, except in the yeast.

The most important point in connection with poultice making is to be quick when once the process is started, and have the vessels warmed before beginning, and always spread the poultice on *flannel.* This last is of vital importance to the success of the poultice.

**Charta** (Papers—Two in number)—

**Charta Epispastica**—Consisting of white wax 4 oz., spermaceti 1½ oz., olive oil 2 oz., resin ¾ oz., cantharides 1 oz., water 6 oz.; digested in a water bath for two hours. Reject the watery portion, add Canada balsam ½ oz., and spread over slips of paper. It is a resinous solution of cantharidine spread upon paper.

**Charta Sinapis**—Paper smeared over with a mixture of powdered black mustard seeds 1 oz., in solution of gutta-percha 2 oz. It should be dipped in tepid water before use.

**Confections** (8 in number).—The last four are Cathartic, the first four faintly Astringent. Confections are soft preparations, of a pasty consistence, containing a medicine blended with some form of sugar, either to preserve it, or to make its administration more agreeable. Under this heading are included the old Conserves and Electuaries.

| CONFECTIO. | COMPOSITION. | STRENGTH. | DOSE. |
|---|---|---|---|
| **Opii** . . . . | Compound powder of opium 192 grs., syrup 1 oz.; mix. | 1 in 40. | 5 to 20 grs. |
| **Piperis** . . . | Powdered black pepper 2 oz., powdered caraway fruit 3 oz., honey 15 oz.; mix. | 1 in 10. | 60 to 120 grs. |
| **Rosæ Caninæ** | Hips, free from seeds, 1 lb., beaten, sifted, and added to sugar, 2 lbs. | 1 in 3. | 1 to 4 drs. |
| **Rosæ Gallicæ** | Fresh red rose petals 1 lb., beaten with sugar, 3 lbs. | 1 in 4. | 1 to 4 drs. |
| **Scammonii** . | Scammony in powder 3 oz., ginger 1½ oz., oil of caraway 1 dr., oil of cloves ½ dr., syrup 3 oz., honey 1½ oz.; mixed, adding the oils last. | 1 in 3. | 10 to 30 grs. |
| **Sennæ** . . . | Powdered senna 7 oz., powdered coriander 3 oz., figs 12 oz., tamarind 9 oz., cassia pulp 9 oz., prunes 6 oz., extract of liquorice ¾ oz., sugar 30 oz., water q.s.<br>Boil the figs and prunes in 24 oz. water for 4 hours; in this digest the cassia and tamarind for 2 hours; sift, add the sugar and liquorice, dissolve, add the senna and coriander, and make up to 75 ozs. | 1 in 11. | 60 to 120 grs. |
| **Sulphuris** . . | Sulphur 4 oz., cream of tartar 1 oz., syrup of orange peel 4 oz., rubbed together. | 1 in 2½.* | 60 to 120 grs. |
| **Terebinthinæ** | Oil of turpentine 1 oz., powdered liquorice 1 oz., honey 2 oz.; rub the first two, add the last, and mix thoroughly. | 1 in 4. | 60 to 120 grs. |

**Decocta** (Decoctions—14 in number) are watery vegetable solutions prepared by boiling. All are made in a covered vessel, except Granati. Three contain more than one solid ingredient. (All are made with distilled water and strained.)

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* The confection of sulphur, consisting of 4 oz. sulphur, 1 oz. cream of tartar, and 4 oz. syrup of orange peel, is almost always given in books as 4 in 9, or 1 in 2¼; but the student will remember that, since 4 fluid ounces of syrup of orange peel *weigh* 5 oz., the strength is, as given here, 4 in 10, or 1 in

| DECOCTUM. | COMPOSITION. | STRENGTH. | DOSE |
|---|---|---|---|
| **Aloes Co.** . . | Extract of socotrine aloes 120 grs., myrrh and saffron, of each 90 grs., carbonate of potash 60 grs., extract of liquorice 1 oz., compound tincture of cardamoms 8 oz., water q.s.<br>Boil all for 5 minutes, except the saffron and tincture, in 1 pint of water; add the saffron, and when cooled add the tincture 2 hours before straining, and make up to 30 oz. with water. | 4 grs. to 1 oz. | ½ to 2 oz. |
| **Cetrariæ** . . | Washed Iceland moss 1 oz., boiled for 10 minutes in 1 pint water, strained while hot, and made to measure 1 pint. | 1 oz. to 1 pt. | 1 to 2 oz. |
| **Cinchonæ Flavæ** | Powdered bark 1¼ oz., Boiled for 10 minutes in 1 pint water, strained when cold, and made to measure 1 pint. | 1¼ oz. to 1 pt. | 1 to 2 oz. |
| **Granati Radicis** | Bark of pomegranate root 2 oz., boiled in water 40 oz., down to 1 pint. | 2 oz. to 1 pt. | 1 to 2 oz. |
| **Hæmatoxyli** . | Logwood chips 1 oz., and cinnamon 60 grs., boiled for 10 minutes in 1 pint water, and made to measure 1 pint. | 1 oz. to 1 pt. | 1 to 2 oz. |
| **Hordei** . . . | Washed barley 2 oz., boiled in water 1½ pint, for 20 minutes, and strained. It is not ordered to be made up to any quantity, as is done in the others, hence it is really stronger than 1 in 15, perhaps 1 in 10. | 1 oz. to 15 oz. | ad libit. |
| **Papaveris** . . | Bruised poppy capsules 2 oz., boiled for 10 minutes in 1½ pint water, and made to measure 1 pt. | 2 oz. to 1 pt. | used externally. |
| **Pareiræ.** . . | Pareira root 1½ oz., boiled for 15 minutes in 1 pint of water, and made to measure 1 pint. | 1½ oz. to 1 pt. | 1 to 2 oz. |
| **Quercus** . . | Oak bark 1¼ oz., boiled for 10 minutes in 1 pint water, and made to measure 1 pint. | 1¼ oz. to 1 pt. | used externally. |
| **Sarsæ.** . . . | Sarsaparilla 2½ oz., digested in 1½ pint boiling water for 1 hour, then boiled for 10 minutes, and made to measure 1 pint. | 2½ oz. to 1 pt. | 2 to 10 oz. |
| **Sarsæ Co.** . . | Sarsaparilla 2½ oz., sassafras root, guaiacum wood and liquorice root, of each ¼ oz., mezereon bark 60 grs., boiling water 1½ pint, digested for 1 hour, then boiled for 10 minutes, and made to measure 1 pint. | 2½ oz. to 1 pt. | 2 to 10 oz. |
| **Scoparii.** . . | Dried tops of broom 1 oz., boiled for 10 minutes in 1 pint water, and made to measure 1 pt. | 1 oz. to 1 pt. | 2 to 4 oz. |
| **Taraxaci** . . | Dried, sliced, and bruised dandelion root 1 oz., boiled for 10 minutes in 1 pint water, strained, and made to measure 1 pint. | 1 oz. to 1 pt. | 2 to 4 oz. |
| **Ulmi** . . . . | Elm bark (cut) 2½ oz., boiled in water 1 pint, for 10 minutes, strained, and made to measure 1 pint. | 2½ oz. to 1 pt. | 2 to 4 oz. |

**Emplastra** (Plasters—14 in number) are solid, adhesive applications for external use, either for support or intended to act as a local means of applying various active remedies As the various ingredients are only added to the active medicine for the sake of such physical qualities as adhesiveness, softness, hardness, and the like, it is not necessary for the student to learn *their* proportions, and as the directions are complicated, and seldom required by the student of Pharmacy, who never makes them, he is referred to the Pharmacopœia.

| EMPLASTRUM. | ARTICLES EMPLOYED IN THE PREPARATION. | STRENGTH. |
|---|---|---|
| **Ammoniaci** *cum.* **Hydrargyro** | Ammoniacum, mercury, olive oil, and sublimed sulphur. | 1 of Hg in 5 |
| **Belladonnæ** . | Extract of belladonna, resin plaster, and rectified spirit. | 1 in 2.* |
| **Calefaciens** . | Cantharides, expressed oil of nutmeg, yellow wax, resin, resin plaster, soap plaster, and boiling water. | 1 in 24 of Cantharides. |
| **Cantharidis** . | Cantharides, yellow wax, suet, lard, and resin. | 1 in 3. |
| **Cerati Saponis** | Hard soap, yellow wax, olive oil, oxide of lead, and vinegar. | 1 in 6. |
| **Ferri** . . . . | Hydrated peroxide of iron, Burgundy pitch, and lead plaster. | 1 in 11. |
| **Galbani** . . . | Galbanum, yellow wax, ammoniacum, and lead plaster. | 1 in 11. |
| **Hydrargyri** . | Mercury, olive oil, sulphur, and lead plaster. | 1 in 3. |
| **Opii** . . . . | Powdered opium and resin plaster. | 1 in 10. |
| **Picis** . . . . | Burgundy pitch, frankincense, resin, yellow wax, expressed oil of nutmeg, olive oil, and water. | 1 in 2. |
| **Plumbi** . . . | Oxide of lead, olive oil, and water. No strength need be given, as it is entirely *oleate of lead*, with a little glycerine. | |
| **Plumbi Iodidi** | Iodide of lead, soap plaster, and resin plaster. | 1 in 9. |
| **Resinæ** . . . | Resin, lead plaster, and hard soap. | 1 in 9½. |
| **Saponis** . . . | Hard soap, lead plaster, and resin. | 1 in 7. |

**Enemata** (Injections, Enemas, or Clysters—6 in number) are liquid preparations for introduction into the large bowel, where they may act either (1) as local sedatives, (2) by exciting reflex action they are expected to cause purgation, or (3) if used in very large quantity they act by washing out the bowel mechanically. (4.) They may be injected with the ing absorbed into the system, and producing the effect of the drug which they contain. Mucilage ie basis of four, and water of two.

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* Strictly speaking, every seven parts of Belladonna plaster contain one part of Alcoholic extract, or the equivalent of six parts of the ordinary official extract. If this latter were left in the plaster, it could not be spread without burning—hence the use of the spirit.

| . | ACTIVE PRINCIPLE. | BASIS. |
|---|---|---|
| . . . | Aloes 40 grs., carbonate of potash 15 grs. | Starch Mucilage 10 oz. |
| lphatis | Sulphate of magnesia 1 oz., olive oil 1 oz. | Starch mucilage 15 oz. |
| . . . | Tincture of opium ½ dr. | Starch mucilage 2 oz. |
| . . . | Oil of turpentine 1 oz. | Starch mucilage 15 oz. |
| . . . | Assafœtida 30 grs., rubbed in a mortar with | Distilled water 4 oz. |
| . . . | Leaf tobacco 20 grs., infused for ½ an hour in | Boiling water 8 oz. |

(Essences—2 in number) are merely very strong ting of a volatile oil dissolved in rectified spirit every five.

**lsi, 1 in 5, and Essentia Menthæ Pip., 1 in 5.**

(Extracts—37 in number) are mostly semi-solid ained by the evaporation of vegetable solutions.

ve classes of extracts, if we divide them accordthods directed for their preparation—

e Fresh or Green Extracts, as aconite, &c.
e Aqueous or Watery, as aloes and opium.
e Alcoholic, as phyostigmatis and rhubarb.
e Ethereal, as mezereon.
e Liquid, as ergot and male fern.

hould remember that these names have no conthe *physical qualities* of the extract, except in e Liquid ones. Thus, the Fresh or Green exther dark brown or black in colour; the Watery be of pilular consistence—like opium, or hard like logwood and aloes.

ts may be, however, better divided, according to nce, into three well marked groups—

*Semi-solid* or pilular extracts, of which there are 25.
*Hard*, Dry, or Brittle, of which there are 4.
*Fluid*, of which there are 8.

extracts will be found in the table on the next table on page 64 contains both the Solid and but the student should remember that the Solid -Extractum Aloes Barbadensis, Aloes Socotrinæ, and Krameriæ.

**Preparation of Extracts.**—The Fresh or Green extracts, of which there are eight, viz.:—

Aconite,
Belladonna,
Hemlock,
Hyoscyamus,
Colchicum,
Colchicum (acetic),
Lettuce,
Dandelion,

are prepared by expressing the juice of the leaves or plant, heating to 130° F., to coagulate the green colouring matter. This is separated and laid aside. The fluid is heated to 200° F. to coagulate all the albumen, which is useless and rejected. The fluid resulting is evaporated by the heat of a water-bath to a syrupy state. The colouring, previously separated, is now added, and the evaporation continued below 140° till the consistence of a soft pill mass is reached.

The watery extracts are prepared by boiling, macerating, infusing, or digesting the substance in cold or hot distilled water, and evaporating the resulting decoction, infusion, or solution to a suitable consistence.

The Alcoholic extracts are prepared by treating the substance with rectified spirit, proof spirit, or spirit and water, and the subsequent evaporation of the tincture thus prepared. The Ethereal extracts, of which there is considered to be only one—viz., mezereon; it is prepared by first making an alcoholic extract, which is next macerated in ether, and the resulting liquid evaporated. Ether is also used in preparing stramonium and the liquid extracts of ergot and male fern. Liquid Extracts are mostly *concentrated* infusions or watery solutions, to which enough spirit is added to preserve them from decomposition.

## LIQUID EXTRACTS.

| EXTRACTUM LIQUIDUM. | MATERIALS USED. | STRENGTH. | DOSE. |
|---|---|---|---|
| **Opii Liq. . .** | Extract of opium, water, and spirit. | 1 in 20. | 10 to 40 mins |
| **Cinchonæ Flavæ Liq. . . .** | Dried yellow bark, water, and spirit. | 4 in 1. | 10 to 30 mins |
| **Sarsæ Liq. .** | Sarsaparilla dried, water at 160°, and spirit. | 2 in 1. | 2 to 4 drs. |
| **Glycyrrhizæ Liq** | Liquorice root dried, water, and spirit. | 1 in 2.<br>(of extract.) | 1 dr. |
| **Belæ Liq. . .** | Bael fruit, water, and spirit. | 1 in 1. | 1 to 2 drs. |
| **Ergotæ Liq. .** | Ergot dried, ether, water, and spirit. | 1 in 1. | 10 to 30 mins |
| **Pareiræ Liq. .** | Pareira dried, boiling water, and spirit. | 1 in 1. | ½ to 2 drs. |
| **Filicis Liq. . .** | Male fern (dried rhizome) and ether. | 10 yield 1. | 15 to 30 mins |

The following table includes all the extracts, except the Liquid preparations.

## EXTRACTS.

| EXTRACTUM. | SOURCE. | MENSTRUUM USED. | DOSE. |
|---|---|---|---|
| **Aconiti** .. .. | Juice of the fresh leaves and tops. | | 1 to 2 grs. |
| **Aloes Barb.** .. | Barbadoes aloes, in fragments. | Boiling water. | 2 to 6 grs. |
| **Aloes Socot.** .. | Socotrine aloes, in fragments. | Do. | 2 to 6 grs. |
| **Anthemidis** .. | The dried flowers and essential oil. | Do. | 2 to 10 grs. |
| **Belladonnæ** .. | Juice of the fresh leaves and young branches. | | ¼ to 1 gr. |
| **Calumbæ** .. .. | The dried root, sliced small. | Cold water. | 2 to 10 grs. |
| **Cannabis Indicæ** | The dried flowering tops. | Rectified spirit. | ¼ to 1 gr. |
| **Colchici** .. .. | Juice of the fresh corms. | | ½ to 2 grs. |
| **Colchici Acetic.** | Do. do. | with acetic acid. | ½ to 2 grs. |
| **Colocynth. Comp** | Pulp of colocynth, extract of socotrine aloes, scammony resin, hard soap, and cardamoms. | Proof spirit. | 3 to 10 grs. |
| **Conii** .. .. .. | Juice of fresh leaves and young branches. | | 2 to 6 grs. |
| **Gentianæ** .. .. | The dried root sliced. | Boiling water. | 2 to 10 grs. |
| **Glycyrrhizæ** .. | The dried powdered root. | Cold water. | 1 dram. |
| **Hæmatoxyli** .. | Dried logwood in chips. | Boiling water. | 10 to 30 grs. |
| **Hyoscyami** .. | Juice of fresh leaves and branches. | | 5 to 10 grs. |
| **Jalapæ** .. .. | The dried powdered root. | Rectified spirit and water. | 5 to 15 grs. |
| **Krameriæ** .. | The dried powdered root. | Cold water. | 5 to 20 grs. |
| **Lactucæ** .. .. | Juice of the flowering herb | | 5 to 15 grs. |
| **Lupuli** .. .. | The dried strobiles of female plants. | Rectified spirit and hot water. | 5 to 15 grs. |
| **Mezerei Æther.** | The dried bark cut small. | Rectified spirit and ether. | Externally. |
| **Nucis Vomicæ** | The dried seeds, powdered after being steamed. | Boiling rectified spirit. | ½ to 2 grs. |
| **Opii** .. .. .. | Opium in thin slices. | Cold water. | ½ to 2 grs. |
| **Papaveris** .. | Dried seedless capsules, powdered. | Boiling water and spirit. | 2 to 5 grs. |
| **Pareiræ** .. .. | The dried powdered root. | Boiling water. | 10 to 20 grs. |
| **Physostigmatis** | The dried powdered Calabar bean. | Rectified spirit. | $\frac{1}{16}$ to ¼ gr. |
| **Quassiæ** .. .. | The dried rasped wood. | Cold water. | 3 to 5 grs. |
| **Rhei** .. .. .. | The dried root sliced or bruised. | Cold water and spirit. | 5 to 15 grs. |
| **Stramonii** .. | The dried, coarsely powdered seeds. | Do., and ether and proof spirit. | ¼ to ½ gr. |
| **Taraxaci** .. .. | The juice of the fresh root. | | 5 to 30 grs. |

As regards doses, the student should remember that the extract of Calabar bean should be given in doses of $\frac{1}{16}$ to ¼ gr.; stramonium, ¼ to ½ gr.; belladonna and Indian hemp, ¼ to 1 gr.; whilst the dose of aconite, colchicum, nux vomica and opium should not exceed 2 grs.

**Glycerina** (Glycerines—5 in number) are solutions of the drug bearing the name, in glycerine.

They consist of one ounce by weight of the drug in four *fluid* ounces of glycerine, except in case of starch, where eight *fluid* ounces are used. The one ingredient being by weight, and the other by volume, and their densities being so different, lead to difficulties in stating accurately the strength. Confused ideas prevail on the subject; subjoined table will explain. The student is recommended, however, to only learn the proportions as in the second column, and to remember that Gly. Amyli. is a firm jelly.

| GLYCERINUM. | AS IN PHARMACOPŒIA. | BY VOLUME. | BY WEIGHT. |
|---|---|---|---|
| **Acidi Carbolici** | 1 oz. by W & 4 oz. by M. | 1 in 4¾. | 1 in 6. |
| **Acidi Tannici** .. | 1 oz. by W & 4 oz. by M. | 1 in 4⅓. | 1 in 6. |
| **Acidi Gallici** .. | 1 oz. by W & 4 oz. by M. | 1 in 4⅓. | 1 in 6. |
| **Amyli** .. .. .. | 1 oz. by W & 8 oz. by M. | 1 in 9. | 1 in 11. |
| **Boracis** .. .. | 1 oz. by W. & 4 oz. by M. | 1 in 4¾. | 1 in 6. |

**Infusa** (Infusions—28 in number) are watery solutions of vegetable principles prepared without boiling. 24 are prepared by pouring boiling distilled water on the vegetable properly comminuted, and placed in a suitable pot with a covered lid, and allowed to stand a definite short time. Two—Quassia and Calumba—are prepared with cold water, and two—Chiretta and Cusparia—with water at 120°. All will darken on the addition of persalts of iron, except Quassia and Calumba, and all should be prepared fresh. All are directed to be strained except kousso. The product should not be made to measure any particular quantity. The most important infusion for the student to remember is digitalis. It contains 3 grs. to each ounce, and the dose is only two to four drams. All the infusions are made with 10 oz. water, except kousso, and only 8 oz. are ordered in it; 12 are made with ½ oz. of the vegetable; 7 with ¼ oz.; linseed and catechu have 160 grs. each; valerian, 120 grs.; gentian and quassia, 60 grs. each; while cascarilla, dulcamara and senna, contain 1 oz. each to every 10 oz.

## INFUSIONS.

| INFUSUM. | INGREDIENTS. | MENSTRUUM. | TIME. | DOSE. |
|---|---|---|---|---|
| **Anthemidis** .. | ½ oz. flowers. | 10 oz. boiling water | 15 min. | 1 to 4 oz. |
| **Aurantii** .. | ½ oz. bitter orange peel cut small. | Do. | 15 min. | 1 to 2 oz. |
| **Aurantii Co.** | ¼ oz. bitter orange peel cut small.<br>60 grs. fresh lemon peel cut small.<br>30 grs. cloves bruised | Do. | 15 min. | 1 to 2 oz. |
| **Buchu** .. .. | ½ oz. leaves bruised. | 10 oz. boiling water | 1 hour. | 1 to 4 oz. |
| **Calumbæ** .. | ½ oz. root cut small. | 10 oz. *cold* water. | 1 hour. | 1 to 2 oz. |
| **Caryophylli** | ¼ oz. cloves bruised. | 10 oz. boiling water | ½ hour. | 1 to 4 oz. |
| **Cascarillæ** .. | 1 oz. powdered bark. | Do. | 1 hour. | 1 to 2 oz. |
| **Catechu** .. | 160 grs. pale catechu coarsely powdered.<br>30 grs. cinnamon bark bruised. | Do. | ½ hour. | 1 to 2 oz. |
| **Chiratæ** .. | ¼ oz. chiretta cut. | 10 oz. water at 120°. | ½ hour. | 1 to 2 oz. |
| **Cinchonæ Fl.** | ½ oz. bark in coarse powder. | 10 oz. boiling water | 2 hours. | 1 to 2 oz. |
| **Cuspariæ** .. | ½ oz. bark in coarse powder. | 10 oz. water at 120° | 2 hours. | 1 to 2 oz. |
| **Cusso** .. .. | ¼ oz. kousso coarsely powdered. | 8 oz. boiling water. | 15 min. | 4 to 8 oz. |
| **Digitalis** .. | 30 grs. dried leaves. | 10 oz. boiling water | 1 hour. | 2 to 4 drs |
| **Dulcamaræ** | 1 oz. dried branches bruised. | Do. | 1 hour. | 1 to 2 oz. |
| **Ergotæ** .. .. | ¼ oz. coarsely powdered. | Do. | ½ hour. | 1 to 2 oz. |
| **Gentianæ Co.** | 60 grs. root sliced.<br>60 grs. bitter orange peel cut.<br>¼ oz. fresh lemon peel cut. | Do. | 1 hour. | 1 to 2 oz. |
| **Krameriæ** .. | ½ oz. root bruised. | Do. | 1 hour. | 1 to 2 oz. |
| **Lini** .. .. .. | 160 grs. of the seeds.<br>60 grs. fresh liquorice root. | Do. | 4 hours. | 2 to 6 oz. |
| **Lupuli** .. .. | ½ oz. dried strobiles. | Do. | 2 hours. | 1 to 2 oz. |
| **Maticæ** .. .. | ½ oz. leaves cut small. | Do. | ½ hour. | 1 to 4 oz. |
| **Quassiæ** .. .. | 60 grs. wood chips. | 10 oz. *cold* water. | ½ hour. | 1 to 2 oz. |
| **Rhei** .. .. .. | ¼ oz. root in thin slices. | 10 oz. boiling water | 1 hour. | 1 to 2 oz. |
| **Rosæ Acidum** | ¼ oz. dried red-rose petals.<br>1 dr. dilute sulphuric acid. | Do. | ½ hour. | 1 to 2 oz. |
| **Senegæ** .. .. | ½ oz. root bruised. | Do. | 1 hour. | 1 to 2 oz. |
| **Sennæ** .. .. | 1 oz. senna & 30 grs. ginger sliced. | Do. | 1 hour. | 1 to 2 oz. |
| **Serpentariæ** | ¼ oz. root bruised. | Do. | 2 hours. | 1 to 2 oz. |
| **Uvæ Ursi** .. | ½ oz. leaves bruised. | Do. | 2 hours. | 1 to 2 oz. |
| **Valerianæ** .. | 120 grs. root bruised. | Do. | 1 hour. | 1 to 2 oz. |

**njectio**—There is but one preparation under this head in harmacopœia, and it is—

**Injectio Morphiæ Hypodermica**, which is a solution of the acetate of morphia, 1 gr. in 12 minims, prepared by dissolving 88 grs. hydrochlorate of morphia in 2 oz. distilled water, precipitating the morphia by slight excess of ammonia, and dissolving the precipitate in 2 oz. distilled water, with a little acetic acid.

**Linimenta** (Liniments or Embrocations—16 in number) are preparations for external application to the skin, and intended to be applied with friction. They are really very thin ointments, though the majority of them are perfectly limpid liquids. The iodide of potassium with soap liniment, if made with curd soap, is a soft solid—like shaving paste. Of the 16, all contain either a fixed or volatile oil or a soap, camphor entering into 12 of them. Those without camphor are ammonia, lime, croton oil, and iodide of potassium with soap.

| LINIMENTUM. | COMPOSITION. | STRENGTH. |
|---|---|---|
| **Aconiti** .. .. | 20 oz. root, 1 oz. camphor, and 20 oz. rectified spirit. | 1 in 1. |
| **Ammoniæ** .. | 1 oz. solution of ammonia, and 3 oz. olive oil. | 1 in 4. |
| **Belladonnæ** .. | 20 oz. root, 1 oz. camphor, and 20 oz. rectified spirit. | 1 in 1. |
| **Calcis**.. .. .. | 2 oz. lime water, and 2 oz. olive oil, agitated together. | 1 in 2. |
| **Camphoræ** .. | 1 oz. camphor, dissolved in 4 oz. olive oil. | 1 in 5. |
| **Camphoræ Co.** | 2½ oz. camphor, 1 dr. oil of lavender, 5 oz. strong solution of ammonia, and 15 oz. rectified spirit. | 1 in 9. |
| **Chloroformi** .. | 2 oz. chloroform, and 2 oz. camphor liniment. | 1 in 2. |
| **Crotonis** .. .. | 1 oz. croton oil, and 3½ oz. each oil of cajuput and spirit. | 1 in 8. |
| **Hydrargyri** .. | 1 oz. each of mercurial ointment, solution of ammonia, and liniment of camphor, mixed with gentle heat. | 1 of oint. in 3, or 1 of Hg. in 6. |
| **Iodi** .. .. .. | 1¼ oz. iodine, ½ oz. iodide of potassium, ¼ oz. camphor, dissolved in 10 oz. rectified spirit. | 1 in 9. |
| **Opii** .. .. .. | 2 oz. tincture of opium, and 2 oz. soap liniment. | 1 in 2. |
| **Potassii Iodidi cum Sapone** | 1½ oz. hard soap, 1½ oz. iodide of potassium. 1 oz. glycerine, 1 dr. oil of lemon, and 10 oz. distilled water. | 1 in 8. (by measure.) |
| **Saponis** .. .. | 2½ oz. hard soap, 1¼ oz. camphor, 3 drs. oil of rosemary, 2 oz. distilled water, and 18 oz. rectified spirit. | 1 in 10. |
| **Sinapis Co.** .. | 1 dr. oil of mustard, 40 grs. ethereal extract of mezereon, 120 grs. camphor, 5 drs. castor oil, and 4 oz. rectified spirit. | 1 in 40. |
| **Terebinthinæ** | 2 oz. soft soap, 1 oz. camphor, and 16 oz. oil of turpentine. | 16 in 19. |
| **Terebinth. Acet.** | 1 oz. each oil of turpentine, acetic acid, and camphor liniment. | 1 in 3. |

**Liquores** (Solutions—39 in number) are solutions of vegetable principles or inorganic substances, mostly in distilled water. One—Epispasticus—comes from the animal kingdom, and it is made with ether. Antim. chlorid. is made with hydrochloric acid; and gutta-percha is dissolved in chloroform. All the rest are made with distilled water.

The following nine are of the same strength, and are important preparations, containing 4 grs. each of active ingredient in the fluid ounce:—Arsenicalis, Arsenici Hydrochloricus, Atropiæ, Atropiæ Sulphatis, Morphiæ Acetatis, Morphiæ Hydrochloratis, Potassæ Permanganatis, Sodæ Arseniatis, and Strychniæ.

The following table shows all the liquors and their strengths:

| LIQUOR. | STRENGTH. | DOSE. |
|---|---|---|
| **Ammoniæ** .. .. .. .. .. | 1 in 3. | 10 to 30 m. |
| **Ammoniæ Acetatis** .. .. | 8 per cent. | 2 to 6 drs. |
| **Ammoniæ Citratis**.. .. .. | 16 per cent. | 2 to 6 drs. |
| **Ammoniæ Fortior** .. .. .. | 32·5 per cent. | |
| **Antimonii Chloridi** .. .. | 36 per cent. | |
| **Arsenicalis**.. .. .. .. .. | 4 grs. in 1 oz. | 2 to 8 m. |
| **Arsenici Hydrochloricus** .. | 4 grs. in 1 oz. | 2 to 8 m. |
| **Atropiæ** .. .. .. .. .. | 4 grs. in 1 oz. | 1 to 2 m. |
| **Atropiæ Sulphatis**.. .. .. | 4 grs. in 1 oz. | 1 to 2 m. |
| **Bismuthi et Ammon. Citratis** | 3 grs. in 1 dr. | ½ to 1 dr. |
| **Calcis** .. .. .. .. .. .. .. | ½ gr. in 1 oz. | 1 to 4 oz. |
| **Calcis Chloratæ** .. .. .. | 13 grs. Cl. in 1 oz. | 10 to 20 m. |
| **Calcis Saccharatus** .. .. | 7 grs. in 1 oz. | ½ to 1 dr. |
| **Chlori** .. .. .. .. .. .. .. | 2·6 grs. in 1 oz. | 10 to 20 m. |
| **Epispasticus** .. .. .. .. | 1 in 2½. | |
| **Ferri Perchloridi** .. .. .. | 1 in 4. | 10 to 30 m. |
| " " **Fortior** .. | 40 per cent. | 2 to 8 m. |
| " **Pernitratis** .. .. .. | 13 per cent. | 10 to 40 m. |
| " **Persulphatis**.. .. .. | 36½ per cent. | |
| **Gutta-Percha** .. .. .. .. | 1 in 9. | |
| **Hydrargyri Nit. Acidus** .. | 48 per cent. | |
| **Hydrargyri Perchloridi** .. | ½ gr. in 1 oz. | ½ to 2 drs. |
| **Iodi**.. .. .. .. .. .. .. | 20 grs. in 1 oz. | 5 to 10 m. |
| **Lithiæ Effervescens** .. .. | 10 grs. in 1 pnt. | 5 to 10 oz. |
| **Magnesiæ Carbonatis**.. .. | 13 grs. in 1 oz. | 1 to 2 oz. |
| **Magnesiæ Citratis**.. .. .. | 3½ per cent. | 5 to 10 oz. |
| **Morphiæ Acetatis**.. .. .. | 4 grs. in 1 oz. | 10 to 60 m. |
| **Morphiæ Hydrochloratis** .. | 4 grs. in 1 oz. | 10 to 60 m. |
| **Plumbi. Subacetatis** .. .. | 27 per cent. | ½ to 2 m. |
| " " **Dilutus** .. | 1 in 80. | ½ to 2 drs. |
| **Potassæ** .. .. .. .. .. .. | 27 grs. in 1 oz. | 15 to 60 m. |
| **Potassæ Effervescens** .. .. | 30 grs. in 1 pnt. | 5 to 10 oz. |
| **Potassæ Permanganatis** .. | 4 grs. in 1 oz. | 2 to 4 drs. |
| **Sodæ** .. .. .. .. .. .. .. | 18·8 grs. in 1 oz. | 15 to 60 m. |
| **Sodæ Arseniatis** .. .. .. | 4 grs. in 1 oz. | 5 to 10 m. |
| **Sodæ Chloratæ** .. .. .. | 1·5 grs. Cl. in 1 dr. | 10 to 20 m. |
| **Sodæ Effervescens**.. .. .. | 30 grs. in 1 pnt. | 5 to 10 oz. |
| **Strychniæ** .. .. .. .. .. | 4 grs. in 1 oz. | 5 to 10 m. |
| **Zinci Chlor.** .. .. .. .. | 46 grs. in 1 dr. | |

**Lotiones** (Lotions—2 in number) are liquid preparations for external application.

**Lotio Hydrargyri Flava,** 18 grs. hyd. perchlor., and 10 oz. lime water.

**Lotio Hydrargyri Nigra,** 30 grs. calomel in 10 oz. lime water.

In the first the yellow or red oxide of mercury is formed; in the latter the black oxide is thrown down.

**Mella** (Honeys—5 in number, including the oxymels), are preparations of honey. The two of any activity—Oxymel Scillæ and Mel Boracis—are inferior to the Syrup of Squill and Glycerine of Borax.

**Mel.**—A saccharine secretion from Apis Mellifica.

**Mel Depuratum.**—Honey melted and strained through flannel.

**Mel Boracis.**—64 grs. powdered borax mixed with 1 oz. honey.

**Oxymel.**—40 oz. honey, 5 oz. acetic acid, and 5 oz. distilled water.

**Oxymel Scillæ.**—1 pint vinegar of squill, and 2 lb. honey.

**Misturæ** (Mixtures—11 in number).

| MISTURA. | COMPOSITION. | STRENGTH PER OZ. |
|---|---|---|
| **Ammoniaci** .. | ¼ oz. ammoniacum rubbed up with 8 oz. water, and strained. | 13¾ grs. |
| **Amygdalæ** .. | 2½ oz. compound powder of almonds and 1 pint water, and strained. | 54 grs. |
| **Creasoti** .. .. | 16 minims each creasote and glacial acetic acid, 1 oz. syrup, ½ dr. spirit of juniper, and 15 oz. water. | 1 minim. |
| **Cretæ** .. .. .. | ¼ oz. prepared chalk, ¼ oz. gum acacia in powder, ½ oz. syrup, and 7½ oz. cinnamon water. | 13¾ grs. |
| **Ferri Aromatica** | 1 oz. pale bark, ½ oz. calumba root, ¼ oz. cloves, ½ oz. iron wire, 3 oz. compound tincture of cardamoms, ½ oz. tincture of orange peel, and peppermint water to 16 oz. | about $\frac{1}{20}$ gr. |
| **Ferri Comp.** .. | 25 grs. sulphate of iron, 30 grs. carbonate of potash, 60 grs. myrrh, 60 grs. sugar, ½ oz. spirit of nutmeg, 9½ oz. rose water. | 2½ grs. |
| **Gentianæ** .. .. | ¼ oz. gentian root, 30 grs. bitter orange peel, 30 grs. coriander, 2 oz. proof spirit, 8 oz. water & strained. | 11 grs. |
| **Guaiaci** .. .. | ½ oz. guaiacum resin, ½ oz. sugar, ¼ oz. gum acacia powdered, and 1 pt. cinnamon water. | 11 grs. |
| **Scammonii** .. | 4 grs. scammony resin in 2 oz. milk. | 2 grs. |
| **Sennæ Co.** .. | 4 oz. sulphate of magnesia, ½ oz. extract of liquorice, 2½ oz. tincture of senna, 10 drs. compound tincture of cardamoms and infusion of senna to 1 pint. | 1 dr. tinct. and 87 grs. mag. sulph. |
| **Spt. Vini. Gallici** | 4 oz. brandy, 4 oz. cinnamon water, the yolks of 2 eggs, ½ oz. sugar. | 3 drs. |

The formula of each of the official mixtures may be regarded as a carefully written recipe in which a mixture is ordered, the ingredients being mostly in suspension. All are made with distilled waters.

The dose may be said to be the same for all—from ½ to 1 or 2 oz.

**Mucilagines** (Mucilages—3 in number) are, strictly speaking, watery solutions of a gum, but in mucilage of starch, the starch is not dissolved. The following are in the Pharmacopœia:—

**Mucilago Acaciæ.**—4 oz. gum acacia dissolved in 6 oz. distilled water.

**Mucilago Amyli.**—120 grs. starch boiled in 10 oz. distilled water.

**Mucilago Tragacanthæ.**—60 grs. of the powdered gum in 10 oz. distilled water.

**Olea** (Oils).—Under this name there are 31 substances in the Pharmacopœia. They may be divided into two well-marked classes—fixed and volatile, the fixed being obtained by expression, and the volatile being products of distillation, except in the case of Ol. Limonis., a volatile oil, which may be either distilled or expressed. In addition to these, which are only known as oils, there are others equally deserving the name, as—camphor, which is a volatile oil, lard, wax, suet, and spermaceti, which are fixed.

Of the 31 oils, one is an animal product—cod liver oil—which is a fixed oil, and, omitting lemon, seven are expressed—Almond, Croton, Linseed, Nutmeg (concrete), Olive, Castor, and Theobroma. Two are semi-solid—viz., Theobroma and Concrete Oil of Nutmeg.

As a rule they vary from colourlessness through straw, and yellow to a pale brown, but cajuput is a deep green colour.

The dose of each of the volatile oils is, speaking generally, about 5 minims. The oil of mustard is a powerful poison, and should be only used externally. Of the fixed oils, croton is only given in doses of ½ to 1 minim, while of the remaining six nearly an ounce each may be given. The Pharmacopœia, it may be noticed, does not give the doses of the oils except in a few instances—viz., castor, cod-liver, savin, copaiba, turpentine, croton, and cubebs. The reason of this is apparent, the spirituous preparations of these substances are the forms in which it is intended most of the oils should be administered, and only the doses of those are mentioned which have no official spirit. The volatile oils are added to the official pill masses for two reasons—to correct griping, and to serve as a ns of distinguishing the various pill masses from each by the odour.

The following table gives the different oils, their source and preparation, and doses·—

| OLEUM. | SOURCE AND HOW PREPARED. | DOSE. |
|---|---|---|
| **Amygdalæ** .. | Expressed from bitter and sweet almonds. | 2 to 4 drs. |
| **Anethi** .. .. | Distilled in Britain from dill fruit. | 1 to 5 mins. |
| **Anisi** .. .. .. | Distilled in Europe and China from the fruit. | 2 to 8 mins. |
| **Anthemidis** .. | Distilled in Britain from the flowers. | 2 to 4 mins. |
| **Cajuputi** .. .. | Distilled in India from the leaves. | 4 to 10 mins. |
| **Carui** .. .. .. | Distilled in Britain from the fruit. | 4 to 10 mins. |
| **Caryophylli** .. | Distilled in Britain from the flower buds. | 2 to 8 mins. |
| **Cinnamomi** .. | Distilled from cinnamon bark. | 2 to 4 mins. |
| **Copaibæ** .. .. | Distilled from the oleo-resin. | 5 to 20 mins. |
| **Coriandri**.. .. | Distilled in Britain from the fruit. | 2 to 4 mins. |
| **Crotonis** .. .. | Expressed from the seeds. | ½ to 1 min. |
| **Cubebæ** .. .. | Distilled in Britain from the unripe fruit. | 5 to 20 mins. |
| **Juniperi** .. .. | Distilled in Britain from the unripe fruit. | 2 to 4 mins. |
| **Lavandulæ** .. | Distilled in Britain from the flowers. | 2 to 4 mins. |
| **Limonis** .. .. | Expressed or distilled in Sicily from the fresh peel. | 2 to 4 mins. |
| **Lini** .. .. .. | Expressed without heat from the seeds. | Used externally. |
| **Menthæ Piperitæ** .. .. | Distilled in Britain from the fresh herb. | 2 to 5 mins. |
| **Menthæ Viridis** | Distilled in Britain from the fresh herb. | 2 to 5 mins. |
| **Morrhuæ** .. .. | Extracted by a heat under 180° from the fresh liver. | 1 to 8 drs. |
| **Myristicæ** .. | Distilled in Britain from the seed kernel. | 2 to 4 mins. |
| **Myristicæ Expressum** .. | Expressed with aid of heat from do. | Not given. |
| **Olivæ** .. .. .. | Expressed in South Europe from the ripe fruit. | ½ to 1 oz. |
| **Phosphoratum** | Expressed oil of almonds and phosphorus, heated to 180°. | 5 to 10 mins. |
| **Pimentæ** .. .. | Distilled in Britain from the unripe berry. | 2 to 4 mins. |
| **Ricini**.. .. .. | Expressed in Calcutta from the seeds. | 2 to 8 drs. |
| **Rosmarini** .. | Distilled from the flowering tops. | 2 to 4 mins. |
| **Rutæ** .. .. .. | Distilled from the fresh herb. | 2 to 4 mins. |
| **Sabinæ** .. .. | Distilled in Britain from fresh tops. | 3 to 4 mins. |
| **Sinapis** .. .. | Distilled with water from the seeds, after the removal of the fixed oil by expression. | Used externally. |
| **Terebinthinæ**.. | Distilled from the oleo-resin. | 10 mins. to 4 drs. |
| **Theobromæ** .. | Expressed with heat from the ground seeds. | Not given. |

**Pilulæ** (Pills—22 in number) are soft solid masses, capable of being easily made into little globular forms, intended to be swallowed whole. More than the half of them are purgative, and the dose is generally 5 to 10 grs., and it is not intended that there should be more than 5 grs. in each pill. The following table gives the name of each, its composition, and strength of the named ingredient:—

| PILULA. | INGREDIENTS. | STRENGTH. |
|---|---|---|
| **Aloes Barb.** .. .. | Barbadoes aloes, hard soap, oil of caraway, and confection of roses. | 1 in 2. |
| **Aloes et Assaf.** .. | Socotrine aloes, assafœtida, hard soap, and confection of roses. | 1 in 4. |
| **Aloes et Ferri.** .. | Sulphate of iron, Barbadoes aloes, compound powder of cinnamon, and confection of roses. | 1 in 5½. |
| **Aloes et Myrrhæ** | Socotrine aloes, myrrh, saffron, and confection of roses. | 1 in 3. |
| **Aloes Socot.** .. | Socotrine, aloes, hard soap, volatile oil of nutmeg, and confection of roses. | 1 in 2. |
| **Assafœtidæ Co.**.. | Assafœtida, galbanum, myrrh, and treacle. | 1 in 3½. |
| **Cambogiæ Co.** .. | Gamboge, Barbadoes aloes, hard soap, compound powder of cinnamon, and syrup. | 1 in 6. |
| **Colocynth. Co.** .. | Colocynth, Barbadoes aloes, scammony, sulphate of potash, oil of cloves, and water. | 1 in 6. |
| **Colocynth. et Hyoscyami**.. | Compound colocynth pill and extract of hyoscyamus. | 2 & 1 in 3. |
| **Conii Co.** .. .. | Extract of hemlock, hippo, and treacle. | 2½ in 3. |
| **Ferri Carb.** .. .. | Saccharated carbonate of iron and confection of roses. | 1 in 1½. |
| **Ferri Iodidi**.. .. | Iron wire, iodine, sugar, powdered liquorice, and distilled water. | 1 in 8½. |
| **Hydrargyri**.. .. | Mercury, confection of roses, and powdered liquorice. | 1 in 3. |
| **Hydrarg. Subchlor. Co.** .. | Calomel, sulphurated antimony, guaiacum resin, and castor oil. | 1 in 5. |
| **Ipecacuanhæ C. Scilla** .. .. | Dover's powder, squill, ammoniacum, and treacle. | 1 in 23½. |
| **Plumbi C. Opio** .. | Acetate of lead, opium, and confection of roses. | 6 & 1 in 8. |
| **Phosphori** .. .. | Phosphorus, balsam of tolu, and yellow wax. | 1 in 91. |
| **Quiniæ** .. .. .. | Sulphate of quinia and confection of hips. | 3 in 4. |
| **Rhei Co.** .. .. | Rhubarb, Socotrine aloes, myrrh, hard soap, oil of peppermint, and treacle. | 1 in 4½. |
| **Saponis Co.** .. .. | Opium, hard soap, and water. | 1 in 6.<br>(of opium.) |
| **Scammonii Co.** .. | Resins of scammony and jalap, curd soap, strong tincture of ginger, and rectified spirit. | 1 in 3½. |
| **Scillæ Co.** .. .. | Squill, ginger, ammoniacum, hard soap, and treacle. | 1 in 5. |

The student of Pharmacy is expected to be able to distinguish each official pill mass by its physical qualities. As nearly all are dark brown or black in colour, only a few can be distinguished by sight—thus, Pil. Hydrarg. is *blue;* Quiniæ, a *delicate pink;* Hyd. Subchlor. Co., a *bright orange;* and Conii, dark *green.* The majority are distinguishable by smell—thus, Colocynth is known by its odour of cloves; Barbadoes aloes, by its caraway; Socotrine aloes, by its nutmeg; Rufus pill, by its saffron; aloes et assafœtida, by its powerful fetid odour; whilst in Pil. Assafœtida Co., the myrrh almost conceals the stinking gum; Pil. Cambogiæ smells strongly of Barbadoes aloes, and is not of the yellow colour which the student might expect; Pil. Scillæ Co. is known by the odour of its ammoniacum; saponis, by its tawny colour and opium smell; rhubarb, by its peppermint; and lead and opium, by the odour of acetic acid.

**Pulveres** (Powders) are 15 in number, viz.:—

| PULVIS. | INGREDIENTS. | DOSE IN GRAINS. | STRENGTH. |
|---|---|---|---|
| **Amygdalæ Co.** .. .. | Sweet almonds, refined sugar, and acacia gum. | 60. | 8 in 13. |
| **Antimonialis** .. .. | Oxide of antimony and phosphate of lime. | 3 to 10. | 1 in 3. |
| **Catechu Co.** .. .. | Catechu, kino, rhatany root, cinnamon, and nutmeg. | 20 to 40. | 1 in 2½. |
| **Cinnamomi Co.**.. .. | Cinnamon, cardamoms, and ginger. | 3 to 10. | 1 in 3. |
| **Cretæ Aromaticus** .. | Cinnamon, nutmeg, saffron, cloves, cardamoms, sugar, and chalk. | 10 to 60. | 1 in 4½. |
| **Cretæ Aromat. c. Opio** | Aromatic chalk powder, and opium. | 10 to 40. | 1 in 40. (opium.) |
| **Elaterii Co.** .. .. .. | Elaterium and sugar of milk. | ½ to 5. | 1 in 10. |
| **Glycyrrhizæ Co.** .. | Senna, liquorice root, and sugar. | 30 to 60. | 1 in 5 |
| **Ipecacuanhæ Co.** .. | Ipecacuanha, opium, and sulphate of potash. | 5 to 15. | 1 in 10. |
| **Jalapæ Co.** .. .. .. | Jalap, cream of tartar, and ginger. | 20 to 60. | 1 in 3. |
| **Kino Co.** .. .. .. | Kino, opium, and cinnamon. | 5 to 20. | 1 in 20 (opium.) |
| **Opii Co.**.. .. .. .. | Opium, black pepper, ginger, caraway, and tragacanth. | 2 to 5. | 1 in 10. |
| **Rhei Co.** .. .. .. | Rhubarb, light magnesia, and ginger. | 20 to 60. | 1 in 4½. |
| **Scammonii Co.**.. .. | Scammony, jalap, and ginger. | 10 to 20. | 1 in 2. |
| **Tragacanthæ Co.** .. | Tragacanth, gum acacia, starch, and sugar. | 20 to 60. | 1 in 6. |

The official powders are all called "compound" except three—Antimonial, Aromatic Chalk, and Aromatic Chalk with opium. They can be for the most part distinguished by their colour, which is given, with the exact weight of each constituent under the name of the drug, in the Materia Medica. The student cannot, however, depend upon colour *alone*, as cinnamon, aromatic chalk, aromatic chalk with opium, ipecacuanha, jalap, rhubarb, and scammony closely resemble each other, only differing by very faint gradations of colour. The smell, along with the colour, will distinguish most of them—thus, the odour of opium distinguishes the aromatic chalk and opium powder from the plain aromatic chalk. Dover's powder and compound jalap powder are almost exactly alike in appearance, and the student is often asked to point out the difference. If he spread out each in a thin layer on pieces of paper, the clear, shining, gritty particles of cream of tartar betray the jalap; while the minute, dark specks of opium reveal the Dover's powder, and the odour of the opium will finally settle the question.

**Spiritus** (Spirits—of which there are 16 in number) are for the most part alcoholic solutions of a volatile oil. The student should remember that all are colourless when freshly prepared except brandy.

| SPIRITUS, | STRENGTH. | DOSE. |
|---|---|---|
| **Spiritus Ætheris** .. .. .. .. .. | 1 in 3. | 30 to 90 mins. |
| " **Ætheris Nitrosi**.. .. .. | Variable. | ½ to 2 drs. |
| " **Ammoniæ Aromaticus** .. | 1 in 17½ (Carbonate). | ½ to 1 dr. |
| " **Ammoniæ Fœtidus** .. .. | 1½ in 20. | ½ to 1 dr. |
| " **Armoraciæ Compositus** | 1 in 8. | 1 to 2 drs. |
| " **Cajuputi**.. .. .. .. .. | 1 in 50. | ½ to 1 dr. |
| " **Camphoræ** .. .. .. .. | 1 in 10. | 10 to 30 mins. |
| " **Chloroformi**.. .. .. .. | 1 in 20. | 20 to 60 mins. |
| " **Juniperi** .. .. .. .. | 1 in 50. | ½ to 1 dr. |
| " **Lavandulæ** .. .. .. .. | 1 in 50. | ½ to 1 dr. |
| " **Menthæ Piperitæ** .. .. | 1 in 50. | ½ to 1 dr. |
| " **Myristicæ** .. .. .. .. | 1 in 50. | ½ to 1 dr. |
| " **Rectificatus** .. .. .. .. | 84 per cent. | |
| " **Rosmarini** .. .. .. .. | 1 in 50. | 10 to 30 mins. |
| " **Tenuior** .. .. .. .. .. | 49 per cent. | |
| " **Vini Gallici** .. .. .. .. | 50 per cent. | |

**Succi** (Juices—of which there are eight.) Three are introduced to make syrup—Buckthorn, Lemon, and Mulberry—and they consist of the juice of the fruit. The remaining five, which are looked upon as the juices proper of the Pharmacopœia, are made by expressing the juice, and adding one measure of spirit to every three. The following table shows their source and dose:—

| SUCCUS. | SOURCE. | DOSE. |
|---|---|---|
| **Belladonnæ** .. .. | Fresh leaves and young branches after flowering. | 5 to 15 mins. |
| **Conii** .. .. .. .. | Fresh leaves gathered after flowering. | ½ to 1 dr. |
| **Hyoscyami** .. .. .. | Fresh leaves and branches of biennial plants. | ½ to 1 dr. |
| **Scoparii** .. .. .. | Fresh tops. | 1 to 2 drs. |
| **Taraxaci** .. .. .. | Fresh root gathered in winter. | 1 to 2 drs. |
| **Limonis** .. .. .. | Ripe fruit } used to make the syrups. | |
| **Mori** .. .. .. .. | Ripe fruit | |
| **Rhammi** .. .. .. | Ripe berries | |

**Suppositoria** (Suppositories—7 in number) are small, solid masses, weighing about 15 grs. and of conical shape, containing some active ingredient blended with a fatty or soapy basis for introduction into the rectum. The following table shows the materials used and the strength of each:—

| SUPPOSITORIA. | INGREDIENTS. | STRENGTH. |
|---|---|---|
| | | GRS. IN EACH. |
| **Acidi Carbolici cum Sapone** .. .. .. | Carbolic acid, curd soap, and starch. | 1 gr. |
| **Acidi Tannici** .. .. | Tannic acid, benzoated lard, white wax, and oil of theobroma. | 3 grs. |
| **Acidi Tannici cum Sapone** .. .. .. | Tannic acid, glycerine of starch, curd soap, and starch. | 3 grs. |
| **Hydrargyri** .. .. .. | Ointment of mercury, benzoated lard, white wax, and oil of theobroma. | 5 grs. (ungt.) |
| **Morphiæ** .. .. .. | Hydrochlorate of morphia, white wax, benzoated lard, and oil of theobroma. | ½ gr. |
| **Morphiæ C. Sapone** | Hydrochlorate of morphia, glycerine of starch, curd soap, and starch. | ½ gr. |
| **Plumbi Co.** .. .. .. | Acetate of lead, opium, white wax, benzoated lard, and oil of theobroma. | 3 grs. and 1 gr. opium. |

**Syrupi** (Syrups—18 in number) are strong solutions of sugar, charged with some preparation either to preserve it or make its administration more agreeable. 15 are of vegetable origin. They are mostly—the S.G. being generally about 1·33 —⅓ heavier than water, and loaf sugar only is used in their preparation, and the water that enters into their composition is to be distilled; the dose averages 1 dram.

The syrups are recognised by their colour, with which the student should be familiar. Syrup, syrup of orange flowers, tolu, chloral, iodide and phosphate of iron are *colourless.*

Syrup of squill, lemon, orange peel, and ginger are straw-coloured; the last two being somewhat muddy.

Syrup of rhubarb, hemidesmus, and poppies are brown, whilst syrup of senna is a dark coffee-brown.

Mulberry syrup is a rich, deep, lake colour, and hence its use to give an agreeable colour to mixtures.

Syrups of buckthorn, red poppy, and red-rose are of brilliant shades of red.

The following table shows their composition and strength:—

| SYRUPUS. | INGREDIENTS. | STRENGTH |
|---|---|---|
| **Syrupus** .. .. | Sugar, 5 lbs.; water, 2½ lbs. | 1 in $1\frac{1}{6}$. |
| **Aurantii** .. .. | Syrup and tincture of orange peel. | 1 in 8. |
| **Aurantii Floris** .. | Orange flower water, sugar, and water. | 1 in 6¼. |
| **Chloral** .. .. .. | Hydrate of chloral, syrup and water. | 1 in 6. |
| **Ferri Iodidi** .. | Iron wire, iodine, sugar and water, each dram contains 4·3 grains. | 1 in 14. |
| **Ferri Phosph.** .. | Granulated sulphate of iron, phosphate of soda, acetate of soda, dilute phosphoric acid, sugar and water; 1 gr. in each dram. | 1 in 60. |
| **Hemidesmi** .. .. | Hemidesmus root, sugar and water. | 1 in 8. |
| **Limonis** .. .. .. | Fresh lemon peel, juice and sugar. | 1 in 2. |
| **Mori** .. .. .. .. | Mulberry juice, sugar and rectified spirit. | 1 in 2. |
| **Papaveris** .. .. | Seedless capsules, rectified spirit, sugar and water. | 1 in 2¼. |
| **Rhamni** .. .. .. | Buckthorn juice, ginger, pimento, sugar and rectified spirit. | 1 in 1. |
| **Rhei** .. .. .. .. | Rhubarb root, coriander fruit, sugar, rectified spirit and water. | 1 in 13⅓. |
| **Rhœados** .. .. | Fresh red poppy petals, sugar, water and rectified spirit. | 1 in 3⅓. |
| **Rosæ Gallicæ** .. | Dried red-rose petals, sugar and water. | 1 in 17. |
| **Scillæ** .. .. .. | Vinegar of squill and sugar. | 1 in 17.<br>(of squills.) |
| **Sennæ** .. .. .. | Senna leaves, oil of coriander, sugar, water and rectified spirit. | 1 in 2. |
| **Tolu** .. .. .. .. | Balsam of tolu, sugar and water. | 1 in 29. |
| **Zingiberis** .. .. | Strong tincture of ginger and syrup. | 1 in 26. |

**Tincturæ** (Tinctures—68 in number) are alcoholic solutions, chiefly of vegetable substances, though three are from the animal kingdom—viz., cochineal, Spanish fly, and castor. Four are from the inorganic world—viz., perchloride of iron, acetate of iron, iodine, and chloroform; the remaining 61 being of vegetable origin. The most of the substances are ordered to be coarsely powdered (ginger for the strong tincture and nux vomica are exceptions), macerated for 48 hours in ¾ of the spirit, then packed in a percolator, and when the fluid ceases to pass, the process is continued with the remaining ¼ of the spirit. The contents of the percolator are then subjected to pressure, the product filtered, mixed with the first liquid, and made up to the original bulk of the spirit employed.

40 tinctures are made in this mixed method of maceration and percolation.

20 are made by simple maceration, generally for seven days.

1 only (strong tincture of ginger) is made by pure percolation.

7 are made by simple solution or mixing.

In the majority, proof spirit (5 spirit and 3 of water) is used, but where an oily or resinous substance is to be operated upon, strong spirit is employed.

40 tinctures are made with proof spirit.

24 are made with rectified spirit.

2 are prepared with sal volatile (Guaiacum and Valerian.)

1 with spirit of ether (Ethereal Tincture of Lobelia.)

1 with tincture of orange peel (Tincture of Quinia.)

2½ oz. to the pint, that is, one part in 8, or 54½ grs. in 1 oz., is the most common strength, since there are 35 tinctures so prepared.

53 tinctures consist of one ingredient and the solvent—"Tinctures Simple."

7 tinctures are called compound—"Tinctures Compound."

8 tinctures, though not *called* compound, contain more than one ingredient and the solvent—"Tinctures Complex."

## SIMPLE TINCTURES.

| TINCTURA. | INGREDIENTS IN 1 PINT. | STRENGTH. | DOSE. |
|---|---|---|---|
| Aconiti | 2½ oz. root, rectified spirit. | 1 in 8. | 5 to 10 m. |
| Arnicæ | 1 oz. root, rectified „ | 1 in 20. | 1 to 2 drs. |
| Assafœtidæ | 2½ oz. gum, rectified „ | 1 in 8. | ½ to 1 dr. |
| Aurantii | 2 oz. dried peel, proof „ | 1 in 10. | 1 to 2 drs. |
| Aurant. Rec. | 6 oz. fresh peel, rectified „ | 1 in 3⅓. | 1 to 2 drs. |
| Belladonnæ | 1 oz. leaves, proof „ | 1 in 20. | 5 to 20 mins. |
| Buchu | 2½ oz. leaves, proof „ | 1 in 8. | 1 to 2 drs. |
| Calumbæ | 2½ oz. root, proof „ | 1 in 8. | 1 to 2 drs. |
| Cannab. Ind. | 1 oz. extract, rectified „ | 1 in 20. | 5 to 20 mins. |
| Cantharidis | ¼ oz. flies, proof „ | 1 in 80. | 5 to 20 mins. |
| Capsici | ¾ oz. fruit, rectified „ | 1 in 27. | 10 to 20 mins. |
| Cascarillæ | 2½ oz. bark, proof „ | 1 in 8. | 1 to 2 drs. |
| Castorei | 1 oz. follicle, rectified „ | 1 in 20. | ½ to 1 dr. |
| Chiratæ | 2½ oz. herb, proof „ | 1 in 8. | 1 to 2 drs. |
| Cinchonæ Fl. | 4 oz. bark, proof „ | 1 in 5. | ½ to 2 drs. |
| Cinnamomi | 2½ oz. bark, proof „ | 1 in 8. | 1 to 2 drs. |
| Cocci | 2½ oz. insects, proof „ | 1 in 8. | 1 to 2 drs. |
| Colchici Sem. | 2½ oz. seeds, proof „ | 1 in 8. | 10 to 30 mins. |
| Conii | 2½ oz. fruit, proof „ | 1 in 8. | 20 to 60 mins. |
| Croci | 1 oz. styles, proof „ | 1 in 20. | ½ dr. |
| Cubebæ | 2½ oz. fruit, rectified „ | 1 in 8. | 1 to 2 drs, |
| Digitalis | 2½ oz. leaves, proof „ | 1 in 8. | 10 to 30 mins. |
| Ergotæ | 5 oz. ergot, proof „ | 1 in 4. | 20 to 60 mins. |
| Ferri Perchlor. | 5 oz. strong liquor rectified .. .. „ | 1 in 4. | 10 to 30 mins. |
| Gallæ | 2½ oz. galls, proof „ | 1 in 8. | 1 to 2 drs. |
| Guaiaci Am. | 4 oz. resin, sal volatile „ | 1 in 5. | ½ to 1 dr. |
| Hyoscyami | 2½ oz. leaves, proof „ | 1 in 8. | ½ to 1 dr. |
| Jalapæ | 2½ oz. root, proof „ | 1 in 8. | 1 to 2 drs. |
| Kino | 2 oz. kino, rectified „ | 1 in 10. | 1 to 2 drs. |
| Krameriæ | 2½ oz. root, proof „ | 1 in 8. | 1 to 2 drs. |
| Laricis | 2½ oz. bark, rectified „ | 1 in 8. | 20 to 30 mins. |
| Limonis | 2½ oz. fresh peel, proof „ | 1 in 8. | 1 to 2 drs. |
| Lobeliæ | 2½ oz. herb, proof „ | 1 in 8. | 10 to 30 mins. |
| Lobeliæ Æth. | 2½ oz. herb, spirit of ether. | 1 in 8. | 10 to 30 m. |
| Lupuli | 2½ oz. strobiles, proof „ | 1 in 8. | 1 to 2 drs. |
| Myrrhæ | 2½ oz. gum resin, rectified „ | 1 in 8. | ½ to 1 dr. |
| Nuc. Vomicæ | 2 oz, seeds, rectified „ | 1 in 10. | 10 to 20 m. |
| Opii | 1½ oz. opium, proof „ | 1 in 13⅓. | 5 to 40 m, |
| Pyrethri | 4 oz. root, rectified „ | 1 in 5. | Not taken. |
| Quassiæ | ¾ oz. chips, proof „ | 1 in 27. | 1 to 2 drs. |
| Quiniæ | 160 grs. quinia, tincture of orange peel. | 1 in 60. | 1 to 2 drs. |
| Sabinæ | 2½ oz. tops, proof „ | 1 in 8. | ½ to 1 dr. |
| Scillæ | 2½ oz. bulb, proof „ | 1 in 8. | 10 to 30 m. |
| Senegæ | 2½ oz. root, proof „ | 1 in 8. | 1 to 2 drs. |
| Serpentariæ | 2½ oz. root, proof „ | 1 in 8. | 1 to 2 drs. |
| Stramonii | 2½ oz. seeds, proof „ | 1 in 8. | 10 to 30 m. |
| Sumbul | 2½ oz. root, proof „ | 1 in 8. | 10 to 30 m. |
| Tolutana | 2½ oz. balsam, rectified „ | 1 in 8. | 10 to 40 m. |
| Valerianæ. | 2½ oz. root, proof „ | 1 in 8. | 1 to 2 drs. |
| Valerian. Am. | 2½ oz. root, salvolatile „ | 1 in 8. | ½ to 1 dr. |
| Veratri Vir. | 4 oz. root, rectified „ | 1 in 5. | 5 to 20 m. |
| Zingiberis | 2½ oz. rhizome, rectified „ | 1 in 8. | ½ to 1 dr. |
| Zingib. Fort. | 10 oz. rhizome, rectified „ | 1 in 2. | 5 to 20 m. |

The student should remember the exceptions to the common strength in tinctures—thus, in each pint—

| | | |
|---|---|---|
| **Tinctura Camphoræ Compositæ** | contains | 30 grs. (camphor) |
| **Tinctura Lavandulæ Compositæ** | „ | 45 min. (oil). |
| **Tinctura Opii Ammoniata** | „ | 100 grs. (opium.) |
| **Tinctura Cantharidis** | „ | ¼ oz. |
| **Tinctura Cardam. Co.** | | |
| **Tinctura Quiniæ** | „ | 160 grs. |
| **Tinctura Quiniæ Amm.** | | |
| **Tinctura Aloes** | „ | ½ oz. |
| **Tinctura Iodi** | | |
| **Tinctura Quassiæ** | „ | ¾ oz. |
| **Tinctura Capsici** | | |
| **Tinctura Arnicæ** | „ | 1 oz. |
| **Tinctura Belladonnæ** | | |
| **Tinctura Cannabis Ind.** | | |
| **Tinctura Castorei** | | |
| **Tinctura Croci** | | |
| **Tinctura Gentianæ Co.** | „ | 1½ oz. |
| **Tinctura Opii** | | |
| **Tinctura Aurantii** | „ | 2 oz. |
| **Tinctura Benzoini Co.** | | |
| **Tinctura Chloroformi Co.** | | |
| **Tinctura Cinchonæ Co.** | | |
| **Tinctura Kino** | | |
| **Tinctura Nucis Vomicæ** | | |
| **Tinctura Rhei** | | |
| **Tinctura Cinchonæ Flav.** | „ | 4 oz. |
| **Tinctura Guaiaci Amm.** | | |
| **Tinctura Pyrethri** | | |
| **Tinctura Veratri Viridis** | | |
| **Tinctura Ergotæ** | „ | 5 oz. |
| **Tinctura Ferri Perchloridi** | | |
| **Tinctura Aurantii Recentis** | „ | 6 oz. |
| **Tinctura Zingiberis Fortior** | „ | 10 oz. |

The remaining thirty-five tinctures contain 2½ oz. to the pint.

### COMPLEX TINCTURES.

| TINCTURA. | INGREDIENTS IN 1 PINT. | STRENGTH. | DOSE. |
|---|---|---|---|
| **Aloes** .. .. .. | ½ oz. Socotrine aloes, 1½ oz. extract of liquorice, proof spt. | 1 in 40. | 1 to 2 drs. |
| **Catechu** .. .. | 2½ oz. catechu, 1 oz. cinnamon, proof spt. | 1 in 8. | 1 to 2 drs. |
| **Ferri Acet.** .. | 2½ oz. solution of persulphate, 2 oz. acetate of potash, rectified spt. | | 5 to 30 m. |
| **Iodi** .. .. .. | ½ oz. iodine, ¼ oz. iodide of potassium, rectified spt. | 1 in 40. | 5 to 20 m. |
| **Opii Ammon.**..<br>(Scotch Paregoric.) | 100 grs. of opium, 180 grs. each saffron and benzoic acid, 1 dr. oil of anise, 4 oz. strong solution of ammonia, rectified spt. | 1 in 96. | ½ to 1 dr. |
| **Rhei** .. .. .. | 2 oz. root, ¼ oz. each of coriander fruit and cardamoms and saffron, proof spirit. | 1 in 10. | 1 to 8 dr. |
| **Sennæ** .. .. | 2½ oz. leaves, 2 oz. raisins, ½ oz. each of caraway and coriander, proof spt. | 1 in 8. | 1 to 4 dr. |
| **Quiniæ Am.** .. | 160 grs. quinia, 2½ oz. solution of ammonia, proof sp. | 1 in 60. | 1 to 2 dr. |

### COMPOUND TINCTURES.

| TINCTURA. | INGREDIENTS IN 1 PINT. | STRENGTH. | DOSE. |
|---|---|---|---|
| **Benzoini Co.** ..<br>(Friar's Balsam.) | 2 oz. benzoin, 1½ oz. storax, ½ oz. tolu, 160 grs. Socotrine aloes, rectified spt. | 1 in 10. | ½ to 1 dr. |
| **Camphoræ Co.**<br>(Paregoric.) | 40 grs. opium, 40 grs. benzoic acid, 30 grs. camphor, ½ dr. oil anise, proof spt. | 1 in 320.<br>1 in 240.<br>(opium.) | 20 to 60 m. |
| **Cardamomi Co.** | ¼ oz. seeds, ¼ oz. caraway, 2 oz. raisins, ½ oz. cinnamon, 60 grs. cochineal, proof spt. | 1 in 80. | 1 to 2 drs. |
| **Chloroformi Co.** | 2 oz. chloroform, 10 oz. tincture of cardamoms (compound), rectified sp. | 1 in 10. | 20 to 60 m. |
| **Cinchonæ Co.**.. | 2 oz. *pale* bark, 1 oz. orange peel, ½ oz. serpentary, 60 grs. saffron, 30 grs. cochineal, proof spt. | 1 in 10. | 1 to 2 drs. |
| **Gentianæ Co.**.. | 1½ oz. root, ¾ oz. orange peel, ¼ oz. cardamoms, proof spt. | 1 in 13⅓. | 1 to 2 drs. |
| **Lavandulæ Co.** | 45 minims oil of lavender, 5 minims oil of rosemary, 75 grs. each cinnamon and nutmeg, 150 grs. red sandal wood, rectified spt. | 1 in 213. | 1 to 2 drs. |

**Trochisci** (Lozenges—10 in number) are small tablets, composed of sugar and gum, blended with a medicinal substance. All contain, in addition to the active substances giving them their name, the following:—Refined sugar, gum acacia, mucilage of acacia, and distilled water; except for the water in Troch. Bismuthi, *rose* water is used, and for the mucilage in Troch. Opii, extract of liquorice is used. The student can distinguish most of the lozenges by their colour, thus—Bismuth, chlorate of potash, and soda are white; morphia a dirty white, tannic acid is a light fawn, and ipecacuanha is buff, morphia et ipecacuanha is a cream colour, catechu a *light* brown, opium a *dark* brown, and iron is an iron-grey colour (Squire). The odour of roses distinguishes bismuth from soda and chlorate of potash. The active ingredients can be easily recognised in each lozenge by the tongue. Each lozenge will weigh about 15 grs., except bismuth, which is much larger. The Pharmacopœia generally directs—"Mix the powders, and add the mucilage and water to form a proper mass; divide into 720 lozenges, and dry these in a hot-air chamber with a moderate heat." In the case of tannic acid and the morphia lozenges, the active ingredients are directed to be dissolved in the water first.

The following table gives the name of each ingredient, and the number of grains of the active substance in each :—

| TROCHISCI. | INGREDIENTS. | GRAINS IN EACH. |
|---|---|---|
| **Acidi Tannici** | Tannin, tincture of tolu, sugar, gum acacia, mucilage, water. | $\frac{1}{2}$ gr. |
| **Bismuthi** | Subnitrate of bismuth, carbonate of magnesia, carbonate of lime, sugar, gum acacia, mucilage, and rose water. | 2 grs. |
| **Catechu** | Catechu, sugar, gum, mucilage and water. | 1 gr. |
| **Ferri Redacti** | Reduced iron, sugar, gum, mucilage and water. | 1 gr. |
| **Ipecacuanhæ** | Ipecacuanha, sugar, gum, mucilage and water. | $\frac{1}{4}$ gr. |
| **Morphiæ** | Hydrochlorate of morphia, tincture of tolu, sugar, gum, mucilage and water. | $\frac{1}{36}$ gr. |
| **Morphiæ & Ipecac** | Do. with the addition of ipecac. | $\frac{1}{36}$ and $\frac{1}{12}$ |
| **Opii** | Extract of opium, tincture of tolu, sugar, gum, extract of liquorice and water. | $\frac{1}{10}$ gr. |
| **Potassæ Chloratis** | Chlorate of potash, sugar, gum, mucilage and water. | 5 grs. |
| **Sodæ Bicarb.** | Bicarbonate of soda, sugar, gum, mucilage and water. | 5 grs. |

**Unguenta** (Ointments—34 in number) are mixtures of medicinal substances with lard, or wax and oil of the consistence of butter, and intended for external application. Those preparations made with wax, and formerly called cerates, are included under this heading. Twenty-nine ointments contain lard, either as prepared, benzoated, or in simple ointment. Seven are mercurial, and in the preparation of two—belladonna and iodide of potassium—distilled water is ordered.

| UNGUENTUM. | COMPOSITION. | STRENGTH. |
|---|---|---|
| **Aconitiæ** .. .. .. | Aconitia, spirit and lard. | 8 grs. to 1 oz |
| **Antim. Tartar.** .. .. | Tartar emetic and simple oint. | 1 in 5. |
| **Atropiæ** .. .. .. | Atropia, spirit and lard. | 8 grs. to 1 oz |
| **Belladonnæ** .. .. .. | Extract and lard. | 80 grs. to 1 oz |
| **Cadmii Iodidi** . .. | Iodide of cadmium and simple ointment. | 1 in 8. |
| **Cantharidis** .. .. | Cantharides, yellow wax and olive oil. | 1 in 8. |
| **Cetacei** .. .. .. .. | Spermaceti, white wax and almond oil. | 1 in 5. |
| **Creasoti** .. .. .. | Creasote and simple ointment. | 1 in 9. |
| **Elemi** .. .. .. .. | Elemi and simple ointment. | 1 in 5. |
| **Gallæ** .. .. .. .. | Galls and benzoated lard. | 80 grs to 1 oz |
| **Gallæ cum Opio** .. | Ointment of galls and opium. | 32 grs. to 1 oz |
| **Iodi** .. .. .. .. .. | Iodine, iodide of potassium, proof spirit and lard. | 1 in 31. |
| **Picis Liquidæ** .. .. | Tar and yellow wax. | 5 in 7. |
| **Plumbi Acetatis** .. | Acetate of lead and benzoated lard. | 12 grs. to 1 oz |
| **Plumbi Carbonatis** | Carbonate of lead and simple ointment. | 1 in 8. |
| **Plumbi Iodidi** .. .. | Iodide of lead and simple ointment. | 1 in 8. |
| **Plumbi Subacet. Co.** | Solution of subacetate of lead, camphor, white wax and almond oil. | 1 in 5½. |
| **Potassæ Sulphuratæ** | Sulphurated potash and lard. | 30 grs. to 1 oz |
| **Potassii Iodidi** .. .. | Iodide of potassium, carbonate of potash, water and lard. | 1 in 8¾. |
| **Resinæ** .. .. .. .. | Resin, yellow wax, and simple ointment. | 1 in 3½. |
| **Sabinæ** .. .. .. .. | Fresh savin tops, yellow wax and lard. | 1 in 3. |
| **Simplex** .. .. .. | White wax, 2 oz.; lard, 3 oz.; and almond oil, 3 oz. | |
| **Sulphuris** .. .. .. | Sublimed sulphur and benzoated lard. | 1 in 5. |
| **Sulphuris Iodidi** .. | Iodide of sulphur and lard. | 30 grs. to 1 oz |
| **Terebinthinæ** .. .. | Oil of turpentine, resin, yellow wax and lard. | 1 in 2. |
| **Veratriæ** .. .. .. | Veratria, olive oil and lard. | 8 grs. to 1 oz |
| **Zinci** .. .. .. .. | Oxide of zinc and benzoated lard. | 80 grs. to 1 oz |

About half of the ointments are a white, yellowish-white, or cream colour. Tar ointment and iodide of sulphur (when kept) are black; iodine, cantharides, galls, galls with opium, resin, and turpentine, are different shades of brown.

Savin, sulphurated potash, and belladonna are greenish-brown; iodide of lead is a bright yellow; sulphur a primrose colour.

The seven ointments of mercury are of such importance as to demand a separate notice, and the student of Pharmacy will be expected to be familiar with their colours, which are more decidedly marked than those of the majority of ointments, thus—

| | |
|---|---|
| **Hydrargyri**<br>**Hydrargyri Co.** | are blue or lead colour. |
| **Hydrarg. Ammon.**<br>**Hydrarg. Subchlor.** | are yellowish-white. |
| **Hydrarg. Nitratis** | is a bright lemon. |
| **Hydrarg. Iod. Rub.** | is a brilliant scarlet. |
| **Hydrarg. Oxid. Rub.** | is a brick red. |

The following table gives their composition and strengths:—

| UNGUENTUM. | COMPOSITION. | STRENGTH. |
|---|---|---|
| **Hydrargyri** .. .. .. | 1 lb. mercury, 1 lb. lard, 1 oz. suet. | 1 in 2. |
| **Hydrg. Ammoniati** | 62 grs. ammoniated mercury, 1 oz. simple ointment. | 1 in 8. |
| **Hydrarg. Comp.** .. | 6 oz. mercurial ointment, 3 oz. olive oil, 3 oz. yellow wax, 1½ oz. camphor. | 1 in 4½ (of Hg.) |
| **Hydrg. Iodidi Rubri** | 16 grs. red iodide, 1 oz. simple ointment. | 16 grs. to 1 oz |
| **Hydrg. Nitratis** .. | 4 oz. mercury, 12 oz. nitric acid, 15 oz. lard, 32 oz. olive oil. | 1 in 15¾ (of Hg.) |
| **Hydrg. Oxidi Rubri** | 62 grs. red precipitate, ½ oz. yellow wax, ¾ oz. almond oil. | 1 in 8. |
| **Hydrg. Subchloridi** | 80 grs. calomel, 1 oz. lard. | 80 grs. to 1 oz |

☞ The following are the only ointments into whose comtion lard does not enter:—

**Cantharides,**

**Spermaceti,**

**Red Oxide of Mercury,**

**Tar,** and

**Compound Subacetate of Lead.**

**Vapores** (Inhalations—5 in number) are preparations in which the vapour of some medicinal substance is taken into the air passages alone, or mixed with the vapour of water.

| VAPOR. | INGREDIENTS. |
|---|---|
| **Acidi Hydrocyanici** | 10 to 15 minims diluted hydrocyanic acid in 1 dr. cold water, and the vapour to be inhaled. |
| **Chlori** .. .. .. .. | 2 oz. chlorinated lime, cold water q.s., do. |
| **Conii** .. .. .. .. | 60 grs. extract of hemlock, 1 dr. solution of potash, 10 drs. water, the vapour of water is made to pass through 20 mins. of this. |
| **Creasoti** .. .. .. | 12 minims creasote and 8 oz. boiling water, to be inhaled. |
| **Iodi** .. .. .. .. .. .. | 1 dr. tincture of iodine, 1 oz. water, and apply heat before inhaling. |

**Vina** (Wines—of which there 11 in number) are simply tinctures made with sherry and orange wine instead of proof spirit.

| VINUM. | COMPOSITION. | STRENGTH. | DOSE. |
|---|---|---|---|
| **Aloes** .. .. .. | Socotrine aloes, cardamoms, ginger root and sherry. | ¾ oz. to 1 pint | 1 to 2 drs. |
| **Antimoniale** .. | Tartar emetic and sherry. | 2 grs. to 1 oz. | 5 to 60 m. |
| **Aurantii** .. .. | (Used for citrate of iron and quinia wines.) | 12 per cent (alcohol.) | —— |
| **Colchici** .. .. | 4 oz. dried corm and 1 pint sherry. | 1 in 5. | 10 to 30 m. |
| **Ferri** .. .. .. | 1 oz. iron wire and 1 pint sherry. | Variable. | 1 to 4 drs. |
| **Ferri Citratis** .. | Citrate of iron and ammonia, orange wine. | 1 gr. in 1 dr. | 1 to 4 drs. |
| **Ipecacuanhæ** .. | Hippo and sherry. | 22 grs. to 1 oz | ½ to 6 drs. |
| **Opii** .. .. .. | Extract of opium, cinnamon, cloves and sherry. | 22 grs. to 1 oz | 10 to 40 m. |
| **Quiniæ** .. .. | Sulphate of quinia, citric acid and orange wine. | 1 gr. to 1 oz. | ½ to 1 oz. |
| **Rhei** .. .. .. | Rhubarb root, canella alba bark and sherry. | 33 grs. to 1 oz | 1 to 2 drs. |
| **Xericum** .. .. | (A Spanish wine.) | 17 per cent (alcohol.) | —— |

Though the great majority of the preparations of the British Pharmacopœia are of a *compound nature*, still the words "Compositus," Composita, or Compositum, are not very often appended. The confections, for instance, are of a very complex constitution, and they are not *called* compound preparations. The compound official preparations are—

| | | |
|---|---|---|
| 2 Decoctions—viz., | | Aloes Co.<br>Sarsæ Co. |
| 1 Extract | ,, | Colocynthidis Co. |
| 2 Infusions | ,, | Gentianæ Co.<br>Aurantii Co. |
| 2 Liniments | ,, | Camphoræ Co.<br>Sinapis Co. |
| 2 Mixtures | ,, | Ferri Co.<br>Sennæ Co. |
| 9 Pills | ,, | Assafœtidæ Co.<br>Cambogiæ Co.<br>Colocynthidis Co.<br>Conii Co.<br>Hyd. Subchlor. Co.<br>Rhei Co.<br>Saponis Co.<br>Scillæ Co.<br>Scammonii Co. |
| 12 Powders | ,, | Amygdalæ Co.<br>Catechu Co.<br>Cinnamomi Co.<br>Ipecacuanhæ Co.<br>Jalapæ Co.<br>Kino Co.<br>Opii Co.<br>Rhei Co.<br>Scammonii Co.<br>Tragacanthæ Co.<br>Elaterii Co.<br>Glycyrrhizæ Co. |
| 1 Spirit | ,, | Armoraciæ Co. |

| | | |
|---|---|---|
| 1 Suppository | —viz., | Plumbi Co. |
| 7 Tinctures | „ | Benzoini Co.<br>Camphoræ Co.<br>Cardamomi Co.<br>Chloroformi Co.<br>Cinchonæ Co.<br>Gentianæ Co.<br>Lavandulæ Co. |
| 2 Ointments | „ | Hydrargyri Co.<br>Plumbi Subacetatis Co. |

Extractum Colocynthidis Compositum is so called because the colocynth pulp ordered in it is first made into an extract with proof spirit, and the insoluble part rejected.

It resembles closely the compound pill of colocynth, both in its therapeutical effects and in its physical qualities. It is easily distinguishable, however, by the absence of the essential oil of cloves, which characterises the pill mass.

The powders are mostly called "Compound" to distinguish them from the powdered drug of the same name.

# PART II.

# MATERIA MEDICA.

**ACACIÆ GUMMI** (Gum Acacia)—Leguminosæ.

Gum Arabic; an exudation from the stem of the acacia, in spheroidal, colourless tears.

Demulcent. Used chiefly to suspend insoluble powders in mixtures.

**Gum acacia enters into chalk and guaiacum mixtures, compound almond, and tragacanth powders, all the lozenges, and the following:—**

**Mucilago Acaciæ.** 4 and 6.

An almost colourless, translucent, viscid liquid; prepared by dissolving 4 oz. gum acacia in 6 oz. cold distilled water.

**Used in the preparation of all the lozenges in the Pharmacopœia, except opium—in which the powdered gum only is used.**

Dose—1 to 4 drs.

Mucilage should not be ordered with tinctures or spirits unless freely diluted with water; and in making a mixture of such ingredients the mucilage should be gradually added to the diluted spirituous liquid.

**ACETUM** (Vinegar).

A brownish, acid liquid, prepared from malt and unmalted grain by the acetous fermentation. Contains 4½ per cent. anhydrous acetic acid.

Refrigerant and Diuretic.

Dose—1 to 2 fluid drams.

**It is used in making soap cerate plaster.**

**Acetum Canthar. and Acetum Scillæ.**—(See under "Canthar. and Scilla.")

**ACIDUM ACETICUM** (Acetic Acid). $C_2H_4O_2$.

A colourless acid liquid, with a pungent odour, prepared from wood by destructive distillation, and containing 28 per cent. of the anhydrous acetic acid.

Counter-irritant, Vesicant, and Caustic.

The following preparations contain free acetic acid:—
Acetum; Acetum Cantharidis; Acetum Scillæ; Acid. Aceticum; Acid. Aceticum Dilutum; Acid. Aceticum Glaciale; Extract. Colchici Aceticum; Liniment. Terebinth. Acet.; Liquor Epispasticus; Mistura Creasoti; Oxymel; Oxymel Scillæ; Syrupus Scillæ; Liquor Morphiæ Acetatis; and Injectio Morphiæ Hypoderm.

**Acidum Aceticum Dilutum.** 1 in 8.

A colourless liquid, prepared by mixing acetic acid 1 pint, and distilled water 7 pints. Contains 3·6 per cent. of anhydrous acid.

Dose and action same as "Acetum."

IN—Acetum Scillæ and Liquor Morphiæ Acetatis.

**Acidum Aceticum Glaciale** (Glacial Acetic Acid).

A colourless liquid, containing 84 per cent. of the anhydrous acid. It crystallises at 34°.
Powerfully Caustic.

IN—Acetum Cantharidis and Mistura Creasoti.

The following are the percentages of anhydrous acetic acid found in

| | | | |
|---|---|---|---|
| VINEGAR, - - - | 4·6 | DILUTE ACETIC ACID, - | 3·6 |
| ACETIC ACID - - | 28·0 | GLACIAL ACETIC ACID, | 84·0 |

**ACIDUM ARSENIOSUM** (Arsenious Acid). $As_2O_3$.

An anhydrous acid, obtained by roasting arsenical ores, occuring as a heavy white powder or in sublimed vitreous masses. Soluble in 100 parts cold water.

Alterative and Tonic. Externally—Caustic.

Dose—$\frac{1}{60}$ to $\frac{1}{12}$ of a grain in solution, after food.

**Liquor Arsenicalis** (Fowler's solution). 4 grs. in 1 oz.

A pinkish liquid, composed of arsenious acid in powder, and carbonate of potash, of each 80 grains; compound tincture of lavender 5 drams, distilled water to 1 pint.

This is the most frequently used preparation of arsenic; and, like all the preparations of the drug, should be commenced in small doses and gradually increased. A good rule is to begin in adults with 3 minims and gradually increase to 8, 12, or more—always after meals, and freely diluted. Each minim contains the $\frac{1}{120}$ of a grain of arsenic.

**Liquor Arsenici Hydrochloricus.** 4 grs. in 1 oz.

(De Valangin's Solution.)

A colourless liquid, prepared by dissolving arsenious acid 80 grains, in hydrochloric acid 2 drams, and distilled water to 1 pint.

Dose—2 to 8 minims, freely diluted.

**Ferri Arsenias.** $Fe_3As_2O_8$.

A tastless, amorphous powder, of a greenish blue colour, insoluble in water, but readily dissolved by hydrochloric acid. Prepared by mixing solutions of arseniate and acetate of soda with one of sulphate of iron, filtering and drying at a low temperature.

Tonic and Alterative like Arsenic. The amount of iron in each dose being so small need not be considered.

Dose—$\frac{1}{16}$ to $\frac{1}{2}$ a grain, in pill.

**Sodæ Arsenias.** $Na_2H\ AsO_4$.

Colourless, transparent prisms, soluble in water; prepared by fusing together a mixture of arsenious acid, nitrate of soda, and dried carbonate of soda, dissolving the fused product in boiling water, and setting the solution aside when the salt crystallises out.

Dose.—$\frac{1}{16}$ to $\frac{1}{8}$ grain, in pill or in mixture.

**Liquor Sodæ Arseniatis.** 4 grs. in 1 oz.

A colourless solution of dried arseniate of soda, 4 grs. in distilled water 1 oz.

Resembles arsenic in its action.

Dose—5 to 10 minims diluted, after food.

**ACIDUM BENZOICUM** (Benzoic Acid). $C_7H_6O_2$.

A crystalline acid, obtained from benzoin by sublimation. In light feathery plates and needles, nearly colourless, and smelling like benzoin.

Expectorant and Diuretic.

Dose—10 to 15 grs.

IN—Ammoniæ Benzoas. Tr. Camph. Co. and Tr. Opii. Ammon.

**ACIDUM CARBOLICUM** (Carbolic Acid). $C_6H_6O$.

An acid obtained by the fractional distillation of coal-tar. In colourless acicular crystals, which become an oily liquid like creasote at 95°

Antiseptic and Escharotic.

Dose—1 to 3 grs., in pill. Externally—Carbolic lotion, 1 part to 40 of water; carbolic oil 1 part to 10 or 20 of olive oil.

**Glycerinum Acidi Carbolici.** 1 *to* 4 (1 *in* 6 by weight).

A thick, colourless liquid, prepared by dissolving carbolic acid 1 oz. in glycerine 4 oz. One fluid dram contains 12 grs. of acid.

Dose—5 to 15 minims, freely diluted.

**Suppositoria Acidi Carbolici Cum Sapone.** 1 gr. in each.

Carbolic acid 12 grs., curd soap 180 grs., starch q. s. Divided into 12 small conical masses.

Antiseptic and Anæsthetic, when introduced into the rectum.

## ACIDUM CITRICUM (Citric Acid). $C_6H_8O_7$.

An acid, in colourless rhombic crystals, obtained from the juice of the lemon or Citrus limetta (Aurantiaceæ) by adding chalk, and decomposing the resulting citrate of calcium by sulphuric acid.

Refrigerant.—Chiefly used as a substitute for lemon juice. 17 grs. dissolved in half an oz. of water are equivalent to one tablespoonful of fresh lemon juice, and will saturate in an effervescing mixture

25 grs. bicarbonate of potash in 1 oz. water.
20 grs. carbonate of potash in 1 oz. water.
35 grs. carbonate of soda in 1 oz. water.
20 grs. bicarbonate of soda in 1 oz. water.
14½ grs. carbonate of ammonia in 1 oz. water.

Dose—10 to 30 grs., in water.

Succus Limonis, Syrupus Limonis, and Vinum Quiniæ contain free citric acid.

## ACIDUM GALLICUM (Gallic Acid). $C_7H_6O_5$.

An acid in yellowish-white, satiny needles, prepared from galls. A paste of powdered galls and water, after being exposed to the air for six weeks, is boiled and the acid crystallises out on cooling. Soluble in 100 parts of cold water.

Astringent. Useful in internal hæmorrhages.

Dose—5 to 10 or 15 grs. in solution, in pill or in powder.

**Glycerinum Acidi Gallici** 1 *to* 4 (1 *in* 6 by weight).

A brownish, thick liquid, prepared by dissolving with heat 1 oz. of gallic acid in 4 oz. of glycerine.

Astringent and Styptic.

Dose—20 to 60 minims, in a mixture.

Preparations containing gallic or tannic acids should not be combined with any preparation containing iron.

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## ACIDUM HYDROCHLORICUM (Hydrochloric Acid).

Hydrochloric acid (HCl) gas, dissolved in water, and forming 31·8 per cent. of the solution, which is nearly colourless and strongly acid, emitting white vapours, with a pungent odour. It is obtained by distilling a mixture of common salt and sulphuric acid.

Internally—A mild Astringent and Tonic. Externally—Caustic.

Dose—2 to 8 minims, but always given as acid. hydrochloricum dilutum.

IN—Acid. Nitro-Hydrochlor. Dil.; Liq. Antim. Chloridi.; Liq. Arsenici Hydrochlor., and the following:—

### Acidum Hydrochloricum Dilutum. 1 in 3·3.

A colourless mixture, of hydrochloric acid and distilled water.

Dose—10 to 30 minims, in water.

IN—Liquor Morph. Hydrochlor, and Liq. Strychniæ.

## ACIDUM HYDROCYANICUM DILUTUM. 1 in 50.

(Dilute Hydrocyanic Acid.) HCN.

Prussic acid, dissolved in water, and forming 2 per cent. of the solution; prepared by acting on ferrocyanide of potassium with sulphuric acid, and distilling the mixture. It is a colourless liquid, with a strong odour of peach blossoms.

Sedative—A most deadly poison.

Dose—2 to 8 minims, in water.

Scheele's prussic acid is 2½ times stronger than the above.

### Vapor Acidi Hydrocyanici.

Dilute hydrocyanic acid, 10 to 15 minims; water 1 dram—mixed in a suitable apparatus, and the vapour inhaled.

## ACIDUM NITRICUM (Nitric Acid). $HNO_3$.

An acid prepared from nitrate of potash, or nitrate of soda, by distillation with sulphuric acid and water, and containing 70 per cent. by weight of $HNO_3$. A colourless, heavy liquid, emitting an acrid, corrosive vapour.

Corrosive—Not used internally in this form.

IN—Acid. Nit. Hydrochlor. Dil., Liq. Ferri. Pernit., Liq. Hydrarg. Nit. Acidus, Ungt. Hyd. Nit., and the following:—

### Acidum Nitricum Dilutum. 1 in 5⅛.

A colourless mixture of nitric acid 6 oz., and distilled water 25 oz.

Tonic and mildly Astringent.

Dose—10 to 30 minims, freely diluted in bitter infusions.

**Acidum Nitro-Hydrochloricum Dilutum.** ¾, and 1 in 8.

Nitric acid, 3 oz.; hydrochloric acid, 4 oz.; distilled water, 25 oz., making a colourless liquid.

Tonic and Astringent.

Dose—5 to 20 minims, in bitter infusions, freely diluted.

**ACIDUM PHOSPHORICUM DILUTUM.** $H_3PO_4$. (10 per cent.)

Orthophosphoric acid ($H_3PO_4$), dissolved in water, corresponding to ten per cent. of $P_2O_5$, and forming a colourless liquid, with a sour taste, prepared by the action of nitric acid on phosphorus, and subsequent distillation.

Tonic and Refrigerant.

Dose—10 to 30 minims, freely diluted.

IN—Syrupus Ferri Phosphatis.

**ACIDUM SULPHURICUM** (Sulphuric Acid). $H_2SO_4$.

A heavy, colourless liquid, of oily appearance, formed by burning sulphur, and acting on the resulting sulphurous acid by means of nitrous vapours. It contains 96·8 per cent. of $H_2SO_4$.

A powerful Corrosive.

**Acidum Sulphuricum Aromaticum.** 1 in 13.

Commonly called "elixir of vitriol." Prepared by macerating 2 oz. of cinnamon, 1¼ oz. ginger, 3 oz. sulphuric acid, and 40 oz. rectified spirit, forming a rich, reddish-brown liquid, with aromatic odour.

Tonic and Astringent.

Dose—5 to 30 minims, freely diluted.

**Acidum Sulphuricum Dilutum.** 1 in 12.

A colourless mixture, of sulphuric acid 7 oz., and distilled water, 76½ oz.

Tonic and Astringent.

Dose—5 to 30 minims, freely diluted.

IN—Infusum Rosæ Acidum, which is a suitable method of administering this acid.

**Acidum Sulphurosum** (Sulphurous Acid). $H_2SO_3$.

Sulphurous acid gas ($SO_2$) dissolved in water, forming a colourless liquid, with a pungent sulphurous odour, and constituting 9·2 per cent. of the solution. Prepared by deoxidising sulphuric acid with wood charcoal in the presence of heat.

Internally, Antiseptic. Externally—Caustic and Antiparasitic.

Dose—½ to 1 dram, very freely diluted.

**ACIDUM TANNICUM** (Tannic Acid). $C_{27}H_{22}O_{17}$.

An acid in pale yellow masses or thin glistening scales, prepared by exposing powdered galls to a damp atmosphere for three days, adding enough ether to form a paste, pressing the mixture, and evaporating the liquid squeezed out.

Powerfully Astringent. Soluble in an equal quantity of water.

Dose—2 to 10 grains in pill, powder, or solution.

**Glycerinum Acidi Tannici.** 1 *to* 4. (1 *in* 6 by weight.)

Tannic acid, 1 oz.; glycerine, 4 oz.; dissolved by gentle heat, making a greenish brown viscid liquid, chiefly used for its local astringent action.

**Suppositoria Acidi Tannici.** 3 grs. in each.

Consisting of tannic acid, benzoated lard, wax, and oil of theobroma, each suppository weighing 15 grains.

A local Astringent and Styptic.

**Suppositoria Acidi Tannici cum Sapone.** 3 and 8½ grs. in each.

Consisting of tannic acid, glycerine of starch, curd soap, and starch. Action like the above.

**Trochisci Acidi Tannici.** ½ gr. in each.

Composed of tannic acid, tincture of tolu, sugar, gum acacia, mucilage of gum acacia, and distilled water.

Dose—1 to 6 lozenges.

**ACIDUM TARTARICUM** (Tartaric Acid). $C_4H_6O_6$.

An acid, in colourless crystals, prepared from the acid tartrate of potash or cream of tartar, by neutralizing a strong solution with chalk, adding chloride of calcium, and treating the tartrate of lime thus formed with diluted sulphuric acid, evaporating and purifying the cystals.

Refrigerant—Chiefly used for the preparation of effervescing mixtures.

Dose—10 to 30 grains in water.

**ACONITI FOLIA** (Aconite Leaves)—Ranunculaceæ.

The smooth, palmate, deeply-divided fresh leaves and flowering tops of Aconitum napellus (Monkshood), grown in Britain.

**Extractum Aconiti.**

The juice of the leaves and tops of aconite, evaporated to the consistence of a soft extract.

Sedative and Cardiac Depressant.

Dose—1 to 2 grs., in pill.

**ACONITI RADIX** (Aconite Root)—Ranunculaceæ.

The dried root of Aconitum napellus, from Great Britain or Germany. A brownish black tapering root, with fleshy fibres arising from it.

Sedative to the Heart.

**Tinctura Aconiti.** 2½ oz. to 1 pint. (54½ grains in 1 oz.)

Aconite root, 2½ oz.; rectified spirit, 1 pint—making a pale sherry-coloured liquid.

Dose—5 to 10 minims.

**Linimentum Aconiti.** 1 in 1.

Aconite root, 20 oz.; camphor, 1 oz.; rectified spirit to 20 oz.

A powerful Sedative and Anodyne. For external use only.

**Aconitia** (Aconitia).

A white amorphous alkaloid, obtained from aconite root. Aconite root is boiled and percolated with spirit, the spirit is evaporated, the watery solution of the residue, treated with ammonia, gives the alkaloid, which is afterwards purified by ether, and water acidulated with sulphuric acid.

A powerful Poison. Should not be given internally.

**Unguentum Aconitiæ.** 8 grs. in 1 oz.

A colourless ointment, composed of aconitia, 8 grs.; rectified spirit, ½ dram; lard, 1 oz.

Similar in action to the liniment.

**ADEPS BENZOATUS** (Benzoated Lard). 10 grs in 1 oz.

Made by heating one pound of prepared lard and 160 grs. of benzoin for two hours, and straining.

Emollient; much less liable to decompose than Adeps Præparatus.

IN—Suppositoria Acid. Tann.; Hydrarg.; Morphiæ and Plumb. Comp.; and in Unguenta, Gallæ; Sulphuris; Zinci and Plumbi Acet.

**ADEPS PRÆPARATUS** (Prepared Lard).

The internal, soft white fat from the abdomen of the pig, purified by washing, melting, and straining.

It enters into the composition of 29 ointments (either as lard, benzoated lard, or simple ointment), and into Emplastrum Cantharidis.

**Unguentum Simplex.**

An emollient white ointment, composed of prepared lard 3 oz., almond oil 3 oz., and white wax 2 oz., melted and stirred till cold.

It enters into eight ointments.

**ÆTHER** (Ether). $C_4H_{10}O$.

A colourless, volatile, inflammable liquid, with a strong odour, prepared from alcohol by the action of sulphuric acid, and subsequently purified by slaked lime and chloride of calcium.

A general diffusible Stimulant and Narcotic.

Dose—20 to 60 minims, in syrup or water.

IN—Collodium, Collodium Flexile, Liq. Epispasticus and Tinct. Lobeliæ Ætherea, and the following:—

**Æther Purus.** $C_4H_{10}O$.

Æther freed from alcohol and water by the action of chloride of calcium, lime, and redistillation.

Used externally as a local Anæsthetic.

**Spiritus Ætheris.** 1 in 3.

Æther 10 oz., rectified spirit 20 oz. (mixed)—making a colourless liquid.

Dose—½ to 2 drams.

**ÆTHER ACETICUS** (Acetic Ether). $C_4H_8O_2$.

A colourless liquid, with an agreeable odour, prepared by distilling acetate of soda, rectified spirit, and sulphuric acid, and purifying by the action of chloride of calcium.

Stimulant and Antispasmodic.

Dose—20 to 60 minims.

**ALBUMEN OVI** (Egg Albumen.)

The liquid white of the egg of the barn-door fowl (Gallus banckiva).

A valuable Antidote in poisoning by mercurial and cuprous salts.

**ALCOHOL AMYLICUM** (Fousel Oil). $C_5H_{12}O$.

A colourless, oily liquid, with an offensive odour, obtained in the distillation of the crude spirit produced by the action of yeast on saccharine solutions.

Only used in the preparation of Amyl Nitris. and Sodæ Valerian.

**ALOE BARBADENSIS** (Barbadoes Aloes)—Liliaceæ.

The thickened juice of the leaf of Aloe vulgaris, from Barbadoes, in dark brown masses, the smallest fragments of which are opaque, with a disagreeable odour like the axilla, and often having pieces of the gourd in which it was imported attached. The powder is a dull greenish yellow.

**ALOE SOCOTRINA** (Socotrine Aloes)—Liliaceæ.

The thickened juice of the leaf of various species of Aloe from Socotra, in golden or reddish brown masses, the small fragments of which are translucent at the edges, with an agreeable aromatic odour, and often having pieces of the skin in which it was imported attached. The powder is a bright yellow or orange colour.

Cathartic— Both varieties are similar in action.

Dose—2 to 6 grs. in pill.

In addition to the preparations bearing the name Aloes, all of which are given below, the drug enters into the following:—

Pil. Cambogiæ Co. 1 in 6.
Pil. Colocynth. Co. 1 in 3.
Pil. Colocy. *et* Hyoscy. 1 in 4½.
Pil. Rhei Co. 1 in 6.
Extract. Colocynth. Co. 1 in 2¼.
Tinct. Benzoini Co. 1 in 60.

**Decoctum Aloes Compositum.** 4 grs. (Ext.) in 1 oz.

A rich, dark brown liquid, prepared by boiling together extract of Socotrine aloes, 120 grs.; myrrh and saffron, 90 grs. each; carbonate of potash, 60 grs.; extract of liquorice, 1 oz.; compound tincture of cardamoms, 8 oz.; distilled water to 30 oz. The tincture should be added after cooling.

Dose—½ to 2 ozs.

**Enema Aloes.** 4 grs. in 1 oz.

Aloes, 40 grs.; carbonate of potash, 15 grs.; mucilage of starch, 10 oz.

**Extractum Aloes Barbadensis.** 4 parts from 5.

A hard extract, obtained by dissolving Barbadoes aloes in boiling water, and evaporating the solution.

Dose—2 to 6 grs. in pill. It is less liable to gripe than the powdered aloes.

**Extractum Aloes Socotrinæ.** 1 part from 2.

Preparation and dose same as the preceding.

Enters into Dec. Aloes Co. and Extract. Colocynth. Co.

**Pilula Aloes Barbadensis.** 1 in 2.

Barbadoes aloes (in powder), 2 oz.; hard soap (in powder), 1 oz.; oil of caraway, 1 dram; confection of roses, 1 oz.; beaten well together.

Dose—5 to 10 grs.

**Pilulæ Aloes Socotrinæ.** 1 in 2.

Socotrine aloes (in powder), 2 oz.; hard soap (in powder), 1 oz.; volatile oil of nutmeg, 1 dram; confection of roses, 1 oz., beaten well together.

Dose—5 to 10 grs.

**Pilula Aloes et Assafœtidæ.** 1 in 4.

Socotrine aloes, assafœtida, hard soap, and confection of roses, of each 1 oz.; well beaten together.

Dose—5 to 10 grs.

Cathartic and Antispasmodic.

**Pilula Aloes et Ferri.** 1 in 5¼.

Sulphate of iron, 1½ oz.; Barbadoes aloes, 2 oz.; compound powder of cinnamon, 3 oz.; confection of roses, 4 oz.; beaten well together.

Cathartic and Emmenagogue.

Dose—5 to 10 grs.

**Pilula Aloes et Myrrhæ** (Rufus' Pill). 1 in 3.

Socotrine aloes, 2 oz.; myrrh, 1 oz.; saffron (dried), ½ oz.; confection of roses, 2½ oz.

Cathartic and Emmenagogue.

Dose—5 to 10 grs.

**Tinctura Aloes.** 11 grs. in 1 oz.

A dark brown liquid, consisting of Socotrine aloes, ½ oz.; extract of liquorice, 1½ oz.; proof spirit, 1 pint.

Dose—1 to 2 drams.

**Vinum Aloes.** 16½ grs. in 1 oz.

A dark brown liquid, consisting of Socotrine aloes, 1½oz.; cardamoms and ginger, of each 80 grs.; sherry, 40 oz.

Dose—1 to 2 drams.

**ALUMEN** (Alum). $NH_4 Al (SO_4)_2$.

A sulphate of ammonia and alumina, in colourless transparent crystalline masses. Crystals soluble in about 13 times their weight of water.

Astringent. In large doses Emetic.

Dose—10 to 20 grains.

**Alumen Exsiccatum** (Dried Alum.)

Prepared by heating alum until it loses 47 per cent. of its weight, and reducing the residue to powder.

Externally—Styptic.

**AMMONIACUM** (Ammoniacum)—Umbelliferæ.

A gum-resinous exudation, from Dorema Ammoniacum, in pale brown tears or masses, breaking with a smooth, *white* fracture.

A Stimulating Expectorant.

Dose—10 to 20 grs. in an emulsion.

**Emplastrum Ammoniaci Cum Hydrargyro.** 12 in 15.

Ammoniacum, 12 oz.; mercury, 3 oz.; olive oil, 1 dram; sulphur, 8 grs.; mixed with the aid of heat.

Resolvent to enlarged glands.

**Mistura Ammoniaci.** 13½ grs. in 1 oz.

Ammoniacum 2 drs., rubbed with 8 oz. distilled water to form a white emulsion, like dirty milk.

Dose—½ to 1 oz.

Ammoniacum also enters into the composition of Empl. Galbani, Pil. Scillæ Co. and Pil. Ipecac. cum Scilla.

**AMMONIÆ BENZOAS** (Benzoate of Ammonia). $NH_4C_7H_5O_2$.

Colourless laminar crystals, prepared by acting on ammonia solution with benzoic acid.

Diuretic.

Dose—10 to 20 grs. in water.

**Ammoniæ Carbonas.** $N_4H_{16}C_3O_8$.

A volatile salt, in translucent crystalline masses, with strong ammoniacal odour, prepared by subliming a mixture of sulphate of ammonia, or chloride of ammonium and carbonate of lime.

A Diffusible Stimulant, Expectorant, and Emetic.

Dose—3 to 10 grs.; 14½ grs. neutralise a tablespoonful of lemon juice.

IN—Liq. Ammon. Acet. and Spt. Ammon. Aromaticus.

**Linimentum Ammoniæ.** 1 in 4.

An emulsion known as "hartshorn and oil," composed of solution of ammonia, 1 oz.; olive oil, 3 oz.

Rubefacient.

**Liquor Ammoniæ.** $NH_3$. 1 in 3.

Ammoniacal gas, dissolved in water, and constituting 10 per cent. of the liquid, prepared by mixing one pint of strong solution of ammonia with two pints of distilled water.

Stimulant and Rubefacient.

Dose—5 to 15 minims, freely diluted.

IN—Linim. Ammoniæ. and Tr. Quinæ Ammon.

**Liquor Ammoniæ Fortior.** $NH_3$.

Ammoniacal gas, dissolved in water, and constituting 32·5 per cent. of the solution, prepared by distilling a mixture of chloride of ammonium, slaked lime, and water.

Vesicant. Should not be used internally.

IN—Liniment. Camph. Co., Liquor Ammoniæ. Liquor Ammoniæ Citratis. Spiritus Ammoniæ Aromaticus. Tintura Opii. Am., Ammoniæ Phosphas. and Spt. Am. Fœtid.

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**Liquor Ammoniæ Acetatis.** About 35 grs. acetate in 1 oz.

Acetate of ammonia, dissolved in water, prepared by neutralising 10 oz. of acetic acid with 3¼ oz., or a sufficiency, of carbonate of ammonia, and adding 50 oz. of distilled water. Should be neutral to test paper.

Diaphoretic, sometimes called Mindererus' Spirit.

Dose—2 to 6 drams, or in alcoholism, 2 oz.

**Liquor Ammoniæ Citratis.** About 72 grs. citrate in 1 oz.

A solution of citrate of ammonia in water, prepared by mixing 3 oz. citric acid and 2¾ oz., or a sufficiency, of strong solution of ammonia, and adding 1 pint of distilled water.

Refrigerant.

Dose—2 to 6 drams.

**Ammoniæ Nitras.** $NH_4NO_3$.

In white deliquescent crystalline masses, prepared by neutralising diluted nitric acid with ammonia, and drying the resulting salt.

Used only for making nitrous oxide.

**Ammoniæ Phosphas.** $(NH_4)_2HPO_4$.

A salt, in transparent colourless prisms, obtained by acting on dilute phosphoric acid with strong solution of ammonia.

Diuretic.

Dose—5 to 20 grains in water.

**Spiritus Ammoniæ Aromaticus.** 2 of Carbonate and 1 of Liq. Ammon. Fort. in 35.

Known as "sal-volatile," an almost colourless liquid, prepared by *distilling* a mixture containing carbonate of ammonia, 8 oz.; strong solution of ammonia, 4 oz.; volatile oil of nutmeg, ½ oz.; oil of lemon, ¾ oz.; rectified spirit, 6 pints; water, 3 pints. Only 7 pints are distilled over.

An agreeable Stimulant.

Dose—½ to 1 dram, freely diluted. It makes a nice mixture when given with Tinct. Card. Co.

IN—Tinctura Guaiaci Ammon. and Tinct. Valerianæ Ammon.

**Spiritus Ammoniæ Fœtidus.** 1 of Liq. Am. Fort. in 10.

Assafœtida, 1½ oz.; strong solution of ammonia, 2 oz.; rectified spirit, 1 pint (distil.) A bright liquid, with a faint trace of colour.

Stimulant and Antispasmodic.

Dose—½ to 1 dram, diluted.

**AMMONII BROMIDUM** (Bromide of Ammonium). $NH_4Br$.

In colourless crystals, which become slightly yellow by exposure to the air, and are very soluble in water; prepared by a process like that followed in making Iodide of Potassium.

Laryngeal Sedative. Useful in Whooping Cough.

Dose—2 to 20 grains. For a child 1 year old, 2 grs. in syrup and water.

**Ammonii Chloridum.** $NH_4Cl$.

Known as Sal Ammoniac. In colourless, inodorous, translucent, fibrous masses; tough, and difficult to powder; very soluble in water; prepared by neutralising hydrochloric acid with ammonia, and evaporating.

Expectorant and Ciliary Excitant.

Dose—5 to 20 grains. Small pieces may be sucked like a lozenge.

IN—Liq. Hydrarg. Perchlor and Liq. Ammoniæ Fortior.

**AMYGDALA AMARA** (Bitter Almonds)—Rosaceæ.

The seed of the bitter almond tree (Amygdalus Communis), from Mogadore. Has a bitter taste, and is broader and shorter than the sweet almond.

Yields, when pressed, Oleum Amygdalæ.

**Amygdala Dulcis** (Sweet Almonds)—Rosaceæ.

The seed of the sweet almond tree (Amygdalus Communis), from Malaga, about one inch in length, narrow, and sharp pointed, with clear brown seed coat, and a sweet taste.

Nutrient and Demulcent.

IN—Oleum Amygdalæ and Pulv. Amygdalæ Co.

**Mistura Amygdalæ.** 2½ oz. to 1 pint.

A white emulsion, made by rubbing 2½ oz. of compound powder of almonds with 20 oz. of distilled water and straining.

Chiefly used as a vehicle for other medicines, and as a basis for lotions.

Dose—1 to 2 oz.

**Oleum Amygdalæ.**

The pale yellow, almost inodorous oil, pressed out from *bitter* and *sweet* almonds.

Demulcent and Emollient.

Dose—1 to 4 drams, in emulsion or mucilage.

Used in the preparations of simple spermaceti, red oxide of mercury, and compound lead ointments, and in phosphorated oil.

This harmless oil, which is commonly called almond oil, should not be confounded with the oil *distilled* from the bitter almond, which is known as the oil of bitter almonds, and which is a deadly poison, being four times the strength of prussic acid. It is not, however, in the Pharmacopœia.

**Pulvis Amygdalæ Compositus.** 8 in 13.

A powder of a dirty-white or pale straw-colour, composed of 8 oz. of *sweet* almonds (with their coats removed by steeping in hot water), 4 oz. sugar, and 1 oz. powdered gum acacia, rubbed into a coarse powder.

Used for making the mixture.

**AMYL NITRIS** (Nitrite of Amyl). $C_5H_{11}NO_2$.

An ethereal, yellowish liquid, with a peculiar odour, prepared by the action of nitric or nitrous acid on fousel oil.

Acts powerfully on arterial spasm.

Dose—The vapour of 2 to 5 minims, poured on the hand, may be inhaled. It should be used with caution.

**AMYLUM** (Starch)—From Graminaceæ.

Starch procured from the seeds of common wheat (Triticum Vulgare), in white columnar masses.

Dietetic and Demulcent. Used as an antidote in poisoning by iodine.

In addition to the mucilage and glycerine, it enters into the suppositories of carbolic acid with soap, morphia with soap, and tannic acid with soap, and compound tragacanth powder.

**Glycerinum Amyli,** 1 *to* 8. 1 *in* 11 by weight.

A translucent jelly, prepared by heating 1 oz. starch and 8 oz. glycerine.

An Emollient Application for External Use.

**Mucilago Amyli.** 12 grs. in 1 oz.

A thick, translucent mucilage, prepared by boiling 120 grs. starch with 10 oz. distilled water for a few minutes.

As a basis for enemas, into four of which it enters, *i.e.*, Aloes, Magnesiæ Sulphatis, Opii, and Terebinthinæ.

Preparations of iodine should not be ordered with starch.

**ANETHI FRUCTUS** (Dill Fruit)—Umbelliferæ.

The oval, flat, brown, seed-like fruit, ⅛th of an inch long, with an aromatic odour, of Anethum Graveolens (common dill), from England or South of Europe.

An Aromatic Stimulant.

Dose—10 to 60 grs., in powder.

**Aqua Anethi.** 1 pound to 1 gallon.

Dose—½ to 2 oz. for adults. A favourite drug in the colic of infants. 1 to 2 drams for a child one year old.

**Anethi Oleum.**

The pale yellow oil distilled in Britain.

Antispasmodic and Carminative.

Dose—1 to 4 minims on sugar.

**ANISUM** (Anise)—Umbelliferæ and Winteraceæ.

The fruit (which is not official) of two plants.

**Anisi Oleum.**

The colourless or pale yellow aromatic smelling oil, which freezes at 50°, distilled from two distinct plants of different natural orders, *i.e.*, Pimpinella Anisum (Umbelliferæ), distilled in Europe; Illicium Anisatum (Winteraceæ), distilled in China.

IN—Essentia Anisi and Tinct. Camphoræ Co., and Tinct. Opii Ammon.

**Essentia Anisi.** 1 in 5.

The colourless solution, prepared by mixing 1 oz. oil of anise with 4 oz. rectified spirit.

Carminative and Antispasmodic.

Dose—10 to 20 minims. For a child 1 year old, 3 minims.

**ANTHEMIDIS FLORES** (Chamomile Flowers)—Compositæ.

The dried single and double flower-heads of the wild and cultivated chamomile (Anthemis nobilis), resembling dried daisy heads.

An Aromatic Stimulant and Bitter Tonic.

Dose—10 to 30 grains in powder, generally given in form of infusion.

**Extractum Anthemidis.**

A soft extract, prepared by evaporating a decoction of flowers, and adding 15 minims of oil of chamomile for every pound of flowers used.

Dose—2 to 10 grains.

**Infusum Anthemidis.** ½ oz. to ½ pint (¼ hour.)

Prepared by infusing ½ oz. of the flowers in 10 oz. boiling water.

The warm infusion is Emetic in moderate doses.

Dose—1 to 4 oz.

**Oleum Anthemidis.**

The greenish blue or yellowish liquid oil distilled from chamomile flowers in Britain.

Used in making the extract.

Dose—2 to 6 minims on sugar or in mucilage.

**ANTIMONIUM NIGRUM** (Black Antimony). $Sb_2S_3$.

A greyish-black crystalline powder, consisting of purified native sulphide of antimony.

Not used in medicine, only introduced to make Antim. Sulphuratum and Liq. Antim. Chloridi.

**Antimonii Oxidum.** $Sb_2O_3$.

A greyish-white powder, prepared by pouring a solution of chloride of antimony into water, washing the oxychloride thus formed, and decomposing it by carbonate of soda.

Diaphoretic and Emetic.

Dose—1 to 4 grains. For a child one year old ⅛ to ¼ gr.

Used in the preparation of Antimon. Tart.

**Pulvis Antimonialis** (Antimonial Powder). 1 in 3.

A substitute for James's powder; of a dull white colour, prepared by mixing oxide of antimony 1 oz., and phosphate of lime 2 oz.

Acts like the Oxide, only weaker.

Dose—3 to 10 grs. For a child one year old ¼ to ½ gr.

**Antimonium Sulphuratum.** $Sb_2S_3$ with $Sb_2O_3$.

A light powder, of a brilliant orange colour, prepared by boiling black antimony with a solution of soda, and adding diluted sulphuric acid to the solution before it cools.

Alterative, Emetic, and Diaphoretic.

Dose—1 to 5 grs. Seldom given alone, but prescribed as Pilula Hydrargyri Subchloridi Composita which contains one grain in every five.

**Liquor Antimonii Chloridi.** $SbCl_3$. 1lb. to 1 quart.

A heavy, reddish liquor, prepared by dissolving black antimony in hydrochloric acid. Known as Butter of Antimony.

Caustic. Not used Internally. It contains 36 per cent. of Chloride of Antimony.

**Antimonium Tartaratum** (Tartar Emetic). $KSbC_4H_4O_7$.

A tartrate of antimony and potash. In colourless, transparent crystals, with triangular facets; soluble in water; prepared by the action of acid tartrate of potash on oxide of antimony.

Emetic, Cardiac Depressant, Expectorant.

Dose—As an Emetic, 1 to 2 grs.; Diaphoretic, $\frac{1}{16}$ to ⅛ gr.; as an Expectorant, ⅛ to ¼. Given in solution in water.

**Unguentum Antimonii Tartarati.** 1 part in 5.

A white ointment, prepared by thoroughly mixing tartar emetic ¼ oz., and simple ointment 1 oz.

Vesicant and Rubefacient.

**Vinum Antimonale.** 2 grs. in 1 oz.

Tartar emetic, 40 grs., dissolved in sherry, 1 pint; making a pale, yellowish brown liquid.

Dose—5 to 60 minims.

For a child one year old, 2 minims as a nauseating Expectorant.

**AQUA** (Water). $H_2O$.

Natural water, as pure as can be obtained.

Used in several preparations in the Pharmacopœia, in the form of Aqua Destillata.

**Aqua Destillata.** $H_2O$.

Water distilled from a copper still with a block-tin worm.

**ARECA** (Areca Nut)—Palmaceæ.

The betel-nut or areca seed, greyish brown in colour, ovoid, hard, shaped like a small horse chestnut, and on section looks like a nutmeg; imported from the East Indies; the seed of Areca Catechu.

Astringent, Anthelmintic, killing the round and tapeworm.

Dose—4 to 6 drs. in powder, in milk or water.

**ARGENTUM PURIFICATUM** (Pure Silver). Ag.

Used in preparing nitrate of silver. In leaf, for the coating of pills, and in the vessels used in making caustic potash.

**Argenti Nitras.** $AgNO_3$.

In flat, colourless crystals, or white rods. Prepared by evaporating a solution of silver in nitric acid, and drying the crystals. To make the rods, commonly known as "Lunar Caustic," the fused crystals are poured into moulds.

Caustic, Astringent, and Nerve Tonic.

Dose—$\frac{1}{6}$ to $\frac{1}{3}$ grain. Sometimes given in doses of one grain in stomach affections, in pill.

As a strong caustic lotion for wounds, ulcers, &c., 1 dr. to 1 oz. As a lotion for ophthalmia in infants, 8 grs. to 1 oz., dropped into the eye. As an injection for the urethra, 2 grs. to 1 oz.

All solutions of caustic should be made with distilled water, and should not contain any trace of organic matter. Sometimes, however, the salt is dissolved in Spt. of Nitre.

**Argenti Oxidum.** $Ag_2O$.

The brown powder precipitated on adding a solution of lunar caustic to lime water.

Tonic and Antispasmodic.

Dose—$\frac{1}{2}$ to 2 grs. in pill. Pills containing this salt with organic matter, such as extracts, alkaloids, &c., often rapidly decompose and sometimes explode.

**ARMORACIÆ RADIX** (Horse-radish Root)—Cruciferæ.

The fresh root of Cochlearia armoracia; has often been unreasonably confounded with aconite. A comparison shows—

| ACONITE ROOT. | HORSE-RADISH ROOT. |
|---|---|
| To be smaller, distinctly tapering to a point, brown on the exterior, odourless, and leaving a tingling sensation on being chewed. | To be larger, much longer, more uniform in circumference, white externally or cream coloured, with strong odour, especially on scraping, and with a characteristic taste. |

Diuretic and Stimulant.

Dose—½ dram in powder.

**Spiritus Armoraciæ Compositus.** 1 in 8.

A colourless liquid, prepared by mixing 20 oz. of horse-radish root, 20 oz. bitter-orange peel, ½ oz. nutmeg, 1 gallon proof spirit, and 2 pints water, and distilling one gallon.

Stimulant and Diuretic.

Dose—1 to 2 drams.

**ARNICÆ RADIX** (Arnica Root)—Compositæ.

The dried rhizome (underground stem) and rootlets of Arnica montana, from southern Europe, from 1 to 3 inches long, and ⅛ inch thick, round, twisted, and furnishing numerous long fibres. Its peppery taste and peculiar odour distinguish it from roots like Senega, Serpentary, and Valerian, which it somewhat resembles.

Stimulant in low feverish conditions.

Dose—10 grs., in powder.

**Tinctura Arnicæ.** 1 oz. to 1 pint.

A brandy coloured liquid, obtained by the percolation of 1 oz. arnica root with 1 pint rectified spirit.

Dose—1 to 2 drams. Chiefly used as a lotion for bruises, 1 oz. to 8 oz. water.

**ARSENIC.** (*Vide* Acid. Arseniosum.)

**ASSAFŒTIDA** (Assafœtida)—Umbelliferæ.

The fetid gum-resin, in irregular softish masses or tears, of a dull yellow and often pinkish colour, obtained by incisions into the living root of Narthex assafœtida, from Afghanistan.

Stimulant and Antispasmodic.

Dose—5 to 20 grs., in pills.

**Enema Assafœtidæ.** 30 grs. to 4 oz.

Prepared by rubbing 30 grs. assafœtida with 4 oz. distilled water, making a whitish emulsion.

**Pilula Aloes et Assafœtidæ.** 1 in 4.

Socotrine aloes, assafœtida, hard soap, and confection of roses, of each 1 oz. well beaten together.

Cathartic and Antispasmodic.

Dose—5 to 10 grs.

**Pilula Assafœtidæ Composita.** 1 in 3½.

Assafœtida, galbanum, and myrrh, of each 2 oz.; treacle, 1 oz.; heated by means of a water-bath, and stirred until of a uniform consistence.

A valuable Antispasmodic. Useful in hysteria.

Dose—5 to 10 grs.

**Spiritus Ammoniæ Fœtidus.** 33 grs. assafœtida to 1 oz.

A clear, faintly yellow liquid, prepared by distilling a mixture of assafœtida 1½ oz. and rectified spirit 15 oz., and adding to the distilled spirit 2 oz. strong solution of ammonia, with as much rectified spirit as will make the product measure 20 oz.

The best fluid form for prescribing assafœtida.

Dose—½ to 1 dram, diluted with water.

**Tinctura Assafœtidæ.** 2½ oz. in 1 pint.

Prepared by macerating 2½ oz. assafœtida with 1 pint rectified spirit.

A bright brown liquid.

Dose—½ to 1 dram.

**ATROPIA** (Atropia). $C_{17}H_{23}NO_3$.

An alkaloid obtained from belladonna in the following manner:—A strong tincture is made by macerating belladonna root in rectified spirit; on adding slaked lime to this the alkaloid is set free along with colouring matters; sulphuric acid, poured upon the precipitate, forms sulphate of atropia, which is again decomposed by carbonate of potash, and, on purification by charcoal, chloroform, and spirit, the alkaloid is obtained in colourless acicular crystals.

Sedative and Anodyne. A very active Poison.

Dose—$\frac{1}{50}$ of a grain. Should not be given in this form.

**Liquor Atropiæ.** 4 grs. in 1 oz.

A colourless liquid, prepared by dissolving 4 grs. of atropia in 1 dr. of rectified spirit and 7 drs. distilled water.

Used chiefly in ophthalmic surgery to dilate the pupil, but, as the spirit smarts, the Liq. Atropiæ Sulph. is preferred.

**Unguentum Atropiæ.** 8 grs. in 1 oz.

A white ointment, prepared by dissolving 8 grs. of atropia in ½ dram of rectified spirit, and mixing with 1 oz. lard.

Anodyne.

**Atropiæ Sulphas.**

A colourless powder, obtained by dissolving atropia in dilute sulphuric acid, and evaporating.

Acts like atropia, and is very soluble. A powerful Poison.

**Liquor Atropiæ Sulphatis.** 4 grs. in 1 oz.

A colourless solution of 4 grs. sulphate of atropia in 1 oz. of distilled water. Containing no spirit, its introduction into the eye does not cause pain.

Dose—2 minims, or 1 minim hypodermically with morphia.

**AURANTII CORTEX** (Bitter-Orange Peel)—Aurantiaceæ.

The dried thin outer part of the rind of the bitter or Seville orange (Citrus bigaradia), from South Europe.

An Aromatic Bitter, and Flavouring ingredient.

**In addition to the preparations bearing its name, it occurs in Infus. Gentianæ Co., Mist. Gentianæ, Spiritus Armoraciæ Co., Tr. Cinchonæ Co., and Tr. Gentianæ Co.**

**Infusum Aurantii.** ½ oz. to ½ pint (¼ hour.)

Prepared by infusing bitter-orange peel ½ oz., in boiling water ½ pint.

A mild Stomachic Tonic.

**Infusum Aurantii Compositum.** ¼ oz. to ½ pint (¼ hour.)

Prepared by infusing in 10 oz. boiling water, ¼ oz. bitter-orange peel, 60 grs. fresh lemon peel, and 30 grs. of cloves.

**Syrupus Aurantii.** 1 in 8.

A flavouring syrup, prepared by adding 1 oz. tincture of orange peel to 7 oz. simple syrup.

**Tinctura Aurantii.** 2 oz. to 1 pint.

The golden, sherry-coloured tincture, prepared by macerating 2 oz. bitter-orange peel in 1 pint proof spirit.

An agreeable Tonic Bitter.

Dose—1 to 2 drams.

**IN—Mist. Ferri Aromat., Tinct. Quiniæ and Syrupus Aurant.**

**Aurantii Fructus.**

The ripe fruit of Citrus Bigaradia.

Action as above.

**Tinctura Aurantii Recentis.** 6 oz. to 1 pint.

Prepared by macerating 6 oz. of the outer part of the *fresh* rind of the bitter orange with 1 pint of rectified spirit.

Acts like the Tinct. Aurantii, but, having more oil in the fresh peel, its flavour is stronger.

Dose—1 to 2 drs.

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**Vinum Aurantii.** 12 per. cent. of alcohol.

Wine of a golden sherry colour, made in Britain, by the fermentation of a saccharine solution, to which the fresh peel of the bitter orange has been added.

An agreeable Bitter and Stimulating Tonic.

Dose—½ to 2 ozs.

IN—Vinum Quiniæ and Vinum Ferri Citratis.

**Aqua Aurantii Floris.**

The nearly colourless fragrant distilled water of the flowers of the bitter and sweet orange trees.

Used for flavouring mixtures and draughts.

**Syrupus Aurantii Floris.** 1 in 6¾.

Prepared by dissolving 3 lbs. sugar in 1 lb. of distilled water, and adding ½ lb. of orange-flower water.

A sweet, colourless syrup, used for flavouring.

**BALSAMUM PERUVIANUM**—Leguminosæ.

A dark brown, viscid, liquid balsam, obtained from Myroxylon Pereiræ, by charring and removing the bark, and allowing the juice to exude; from Salvador.

A Stimulating Expectorant. Externally—A Stimulant to ulcers.

Dose—10 to 15 minims, in mucilage or with beaten-up egg.

**BALSAMUM TOLUTANUM**—Leguminosæ.

A soft, fragrant, solid balsam, exuding from incisions in the bark of Myroxylon toluifera, from New Granada.

A weak Expectorant.

Dose—10 to 20 grs. in mucilage or egg.

In addition to the Syrup and Tincture, it enters into Tr. Benzoini Co.

**Syrupus Tolutanus.** 1 in 29.

Prepared by boiling 1¼ oz. balsam of tolu in 1 pint distilled water, filtering when cold, and adding 2 lbs. sugar to make a colourless syrup.

Dose—1 dram. Chiefly used to sweeten cough mixtures.

**Tinctura Tolutana.** 2½ oz. to 1 pint.

A bright, reddish brown liquid, prepared by dissolving 2½ oz. of tolu balsam in 1 pint of spirit.

A Stimulating Expectorant.

Dose—20 to 40 minims, in emulsion or in sherry.

Used in the preparation of Morphia, Tannin, Opium, and "Morphia and Hippo" lozenges.

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**BEBERIÆ SULPHAS** (Sulphate of Beberia)—Lauraceæ.

The sulphate of an alkaloid, in brown, thin, translucent scales, prepared from Nectandra bark, by treating it with weak sulphuric acid, precipitating the alkaloid with ammonia and lime, and, after acting on it with spirit and dilute sulphuric acid, evaporating.

Tonic and Antiperiodic.

Dose—1 to 10 grs. in pill, or solution with sulphuric acid.

**BELÆ FRUCTUS** (Bael Fruit)—Aurantiaceæ.

The dried, half-ripe fruit of Ægle Marmelos, from Malabar, about the size of an orange, with a hard rind of greyish brown colour.

Astringent.

**Extractum Belæ Liquidum.** 1 in 1.

A deep, brown-coloured liquid, prepared by evaporating an infusion of 1 pound bael fruit, made with 12 pints of cold distilled water, to 14 oz., and then adding 2 oz. rectified spirit.

Dose—1 to 2 drs., in Dysentery.

**BELLADONNÆ FOLIA** (Belladonna Leaves)—Solanaceæ.

The *fresh* and *dried* ovate, acute, smooth leaves and young branches of deadly nightshade, Atropa belladonna, from British plants.

Narcotic and Anodyne. A powerful poison.

**Emplastrum Belladonnæ.** 1 in 2. (See note at foot of p. 61.)

A dark, olive green solid, prepared by acting on 3 oz. of extract of belladonna with 6 oz. spirit, distilling or evaporating the clear solution, and adding 3 oz. resin plaster to the residual alcoholic extract.

Anodyne.

**Extractum Belladonnæ.**

A soft, dark green extract, with a peculiar heavy odour, prepared by evaporating the juice of the fresh young leaves and branches of belladonna.

Anodyne and Sedative.

Dose—¼ to 1 gr., in pill, or, as an external application, mixed with as much glycerine as will make it into a cream.

**Succus Belladonnæ.**

The coffee-brown coloured juice of the young fresh leaves and branches of belladonna, with the addition of ⅓rd its bulk of rectified spirit.

Action—Anodyne.

Dose—5 to 15 minims.

**Tinctura Belladonnæ.** 1 oz. to 1 pint.

A dark, olive-brown liquid, prepared by the percolation of 1 oz. of dried belladonna leaves with 1 pint of proof spirit.

Dose—5 to 20 minims. One minim for a child one year old (with whooping cough).

**Unguentum Belladonnæ.** 80 grs. to 1 oz.

A brownish green ointment, made by rubbing 80 grs. of extract of belladonna with a few drops of water, and adding 1 oz. of lard.

A Soothing application to inflamed piles.

**BELLADONNÆ RADIX** (Belladonna Root)—Solanaceæ.

The dried, branched, whitish root, 1 to 2 feet long, of Atropa belladonna, from Germany or Britain.

In action resembling the leaves.

Used in preparing Atropia and Liniment of Belladonna.

**Linimentum Belladonnæ.** 1 part in 1.

A light, yellowish-brown coloured liquid, prepared by the percolation of 20 oz. belladonna root and 1 oz. camphor, with 20 oz. rectified spirit.

A powerful Anodyne.

**BENZOINUM** (Benzoin)—Styraceæ.

The balsamic resin, in mottled masses or light brown lumps, made up of tears, procured in Siam and Sumatra from incisions into the bark of Styrax benzoin.

Diuretic and Expectorant. Seldom used internally.

Dose—5 to 10 grs. of the powder, in milk.

IN—Adeps Benzoatus, and the following:—

**Tinctura Benzoini Composita.** 2 oz. to 1 pint.

A dark, reddish-brown liquid, prepared by macerating 2 oz. benzoin, 1½ oz. storax, ½ oz. balsam of tolu, and 160 grs. Socotrine aloes in 1 pint rectified spirit.

A Stimulating Expectorant. Commonly known as Friar's balsam.

Dose—½ to 1 dram in emulsion. Water decomposes it.

**Benzoic Acid and Preparations.** (See Acidum Benzoicum.)

**BISMUTHUM** (Bismuth) Bi.

A crystalline metal used in preparing the following:—

**BISMUTHUM PURIFICATUM** (Pure Bismuth) Bi.

In shining crystalline masses, of a greyish-white colour, with a rose tinge, procured by fusion of nitre with the impure metal.

**Bismuthi Carbonas.** 2 ($Bi_2CO_5$.)

A white powder, prepared by dissolving bismuth in nitric acid, and acting on the solution of the nitrate thus formed by carbonate of ammonia, when the carbonate of bismuth is precipitated.

Antacid, Sedative, and Tonic to the gastric mucous membrane.

Dose—5 to 20 grs. suspended in a mixture with mucilage or syrup.

**Bismuthi Subnitras.** $BiNO_4$.

A heavy white powder, prepared by dissolving bismuth in nitric acid, and pouring the solution into distilled water, when the salt is thrown down in minute crystalline scales.

Action and dose same as Bismuthi Carbonas.

**Bismuthi Oxidum.** $Bi_2O_3$.

A dull, lemon-yellow powder, prepared by boiling 1 lb. of subnitrate of bismuth with 4 pints of solution of soda, and washing the residue.

Action and dose same as Bismuthi Carbonas.

**Liquor Bismuthi et Ammoniæ Citratis.** 3 grs. of oxide of Bismuth in 1 dram.

A colourless solution, prepared by dissolving 430 grs. of bismuth in 2 oz. nitric acid, adding a solution of 2 oz. citric acid, and redissolving the precipitate formed by solution of ammonia, and making up to 1 pint with distilled water.

Acts similarly to the Carbonate and Nitrate.

Dose—½ to 1 dram.

**Trochisci Bismuthi.** 2 grs. in each.

Prepared by mixing subnitrate of bismuth, 1,440 grs.; carbonate of magnesia, 4 oz.; carbonate of lime, 6 oz.; sugar, 29 oz.; gum acacia, 1 oz.; mucilage of gum acacia, 2 oz.; rose water q.s., and dividing into 720 lozenges.

Dose—1 to 6 lozenges.

**BORAX** (Borax). $Na_2B_4O_7$.

A native salt, in large, transparent, colourless crystals, of complex chemical composition, and formerly called biborate of soda.

Emmenagogue and Diuretic. Locally, it has an Alterative action on mucous membranes.

Dose—5 to 40 grs.

**Glycerinum Boracis.** 1 to 4. (1 in 6 by weight.)

A colourless thick liquid, prepared by dissolving 1 oz. borax in 4 oz. glycerine.

Used for its soothing action on diseased mucous surfaces.

**Mel Boracis.** 1 in 8.

A mixture of 64 grs. of borax and 1 oz. clarified honey. Resembles honey in appearance, and acts like Glycerinum Boracis.

**BROMUM** (Bromine). Br.

A dark-brown, pungent smelling liquid element, obtained from sea water. Not used internally.

Caustic and Disinfectant.

**Ammonii Bromidum.** $NH_4Br$.

In colourless crystals, becoming slightly yellow on exposure.

Prepared in a similar manner to Iodide of Potassium.

A Laryngeal Sedative in Whooping Cough, Epilepsy, &c.

Dose—2 to 20 grs. 2 grs. for a child one year old.

**Potassii Bromidum.** KBr.

Colourless cubical crystals, prepared by adding bromine to solution of potash, evaporating, heating the resulting bromide and bromate with charcoal, which decomposes the bromate, leaving K Br., which should be dissolved and allowed to crystallise out.

Action like Ammon. Bromidum. In large doses, Hypnotic.

Dose—5 to 30 grs. 2 grs. for a child one year old.

**BUCHU FOLIA** (Buchu Leaves)—Rutaceæ.

The dried leaves of three plants—Barosma betulina, Barosma crenulata, Barosma serratifolia, imported from Cape of Good Hope. Small, pale green, shining and smooth leaves, with a powerful minty odour. Marked with pellucid dots at the indentations and apex.

A Stimulating Diuretic.

Dose—10 to 30 grs., in powder or infusion.

**Infusum Buchu.** ½ oz. to ½ pint (1 hour.)

Prepared by infusing ½ oz. buchu leaves in 10 oz. boiling water.

**Tinctura Buchu.** 2½ oz. to 1 pint.

A bright, brownish green liquid, prepared by the percolation of 2½ oz. buchu leaves with 1 pint proof spirit.

Dose—1 to 2 drs.

**CADMII IODIDUM** (Iodide of Cadmium). $CdI_2$.

A salt in brilliant pearly-white flat crystals, formed by the direct union of iodine and cadmium in the presence of water.

A Glandular Absorbent when applied locally.

**Unguentum Cadmii Iodidi.** 1 in 8.

A yellowish white ointment, prepared by rubbing 62 grs. of cadmium iodide with 1 oz. simple ointment.

Absorbent to glandular enlargements.

**CAJUPUTI OLEUM** (Oil of Cajuput)—Myrtaceæ.

A bright green mobile oil, distilled from the leaves of Melaleuca minor, from India.

A powerful diffusible Stimulant, and Antispasmodic.

Dose—2 to 8 minims, on sugar or in an emulsion.

**Cajuputi Spiritus.** 1 in 50.

A colourless or very pale green spirit, consisting of oil of cajuput, 1 oz.; rectified spirit, 49 oz.

Dose—½ to 1 dram.

In addition to the Spirit, Ol. Cajuputi enters into Linimentum Crotonis.

**CALCII CHLORIDUM** (Chloride of Calcium). $CaCl_2$.

In white agglutinated masses, prepared by neutralising *pure* hydrochloric acid with *pure* chalk, and evaporating the solution to dryness, and strongly heating the residue.

Alterative in Scrofula and Phthisis.

Dose—10 to 20 grs.

Chloride of calcium should not be confounded with the so called chloride of lime.

**Calcis Carbonas Præcipitata.** $CaCO_3$.

A white crystalline powder, being one of the four forms of carbonate of lime in the Pharmacopœia, prepared by mixing a boiling solution of carbonate of soda with one of chloride of calcium.

Antacid and mildly Astringent.

Dose—10 to 60 grs.

IN—Trochisci Bismuthi, 4 grs. in each.
The other carbonates of lime are—Creta, Creta Præparata, and Marmor Album, which see.

**Calcis Hypophosphis.** $Ca, 2PH_2O_2$.

A white, pearly crystalline salt, prepared by heating phosphorus with slaked lime and water, and evaporating the solution after separating uncombined lime.

Nervine Tonic. Recommended in early stages of Phthisis.

Dose—5 to 10 grs., in water.

**Calcis Phosphas.** $Ca_3P_2O_8$.

A light, white amorphous powder, insoluble in water, prepared by dissolving bone ash in hydrochloric acid and water, and adding ammonia until the phosphate is thrown down.

Nervine Tonic.

Dose—10 to 20 grs.

IN—Pulv. Antimonialis, 2 parts in 3. For impure bone ash see Os Ustum.

**CALX** (Lime). $CaO$.

Lime in compact whitish masses, obtained by burning chalk or limestome $CaCO_3$.

Caustic.

Used for making Calcis Hydras.

**Calcis Hydras.** $CaH_2O_2$.

A white powder, known as slaked lime, prepared by adding about half its weight of water to lime.

Caustic.

IN—Liquor Calcis and Liquor Calcis Saccharatus.

**Linimentum Calcis.** 1 in 2.

Lime water and olive oil, of each 2 oz. (mixed), forming a thick, whitish emulsion, known as Carron oil.

Sedative application to burns and scalds.

**Liquor Calcis.** ½ gr. in 1 oz.

Lime water, prepared by adding slaked lime 2 oz., to water 1 gallon, and decanting the clear colourless liquid.

Antacid and Astringent.

Dose—1 to 4 oz., in milk ; ½ to 1 dr. for a child one year old.

Used in the preparation of Argenti Oxid., Liniment. Calcis, Lotio Hydrarg. Flava., Lotio Hydrarg. Nigra.

**Liquor Calcis Saccharatus.** 7 grs. in 1 oz.

The colourless or slightly yellow liquid, prepared by adding slaked lime 1 oz., sugar 2 oz., to water 1 pint, mixing and decanting.

Same as Liquor Calcis in action.

Dose—15 to 60 minims in water or milk.

**CALX CHLORATA** (Chlorinated Lime).
$CaCl_2$ and $CaCl_2O_2$.

A dirty white powder, obtained when slaked lime is exposed to the action of chlorine gas, as long as the latter is absorbed. It is known as bleaching powder. It has bleaching and disinfecting properties, and is astringent.

Only given as Liq. Calc. Chlor.

**Liquor Calcis Chloratæ.** 1 lb. to 1 gallon.

A colourless solution of chlorinated lime in water.

Astringent and Antiseptic.

Dose—10 to 30 minims, freely diluted. Chiefly used as a deodoriser. Each oz. contains 13 grs. chlorine.

**Vapor Chlori** (Inhalation of Chlorine).

2 oz. chlorinated lime, moistened with a sufficiency of cold water, so that the vapour arising may be inhaled.

**CALUMBÆ RADIX** (Calumba Root)—Menispermaceæ.

The root, cut in round or oval flat yellow slices, with radiating lines; of Jateorrhiza calumba and Cocculus palmatus, from Africa.

A Bitter Tonic, without Astringency.

Dose—5 to 20 grs. in powder. Seldom given in this form.

**Extractum Calumbæ.**

A dark, soft extract, prepared by *cold* water from calumba root.

Dose—2 to 10 grs., in pills.

**Infusum Calumbæ.** ½ oz. to 10 oz., cold (1 hour.)

Prepared by macerating ½ oz. calumba root in ½ pint of *cold* water.

Dose—1 to 2 oz.

**Tinctura Calumbæ.** 2½ oz. to 1 pint.

A greenish brown liquid, prepared by percolating 2½ oz. calumba root with 1 pint of proof spirit.

Dose—½ to 2 drams.

As calumba root and its preparations do not contain any tannin, they can be ordered with all the preparations of iron. Cold water is used in making the infusion, lest any of the starch should be extracted.

In addition to the above preparations, calumba root enters into Mistura Ferri Aromatica.

**CAMBOGIA** (Gamboge)—Guttiferæ.

A gum-resin in tawny yellow cylindrical pieces, obtained from wounds in the bark of Garcinia morella, from Siam.

A Hydragogue Cathartic.

Dose—1 to 4 grs., in pill.

**Pilula Cambogiæ Composita.** 1 in 6.

Composed of gamboge, Barbadoes aloes, compound cinnamon powder, of each, 1 oz.; hard soap, 2 oz., syrup, q.s.; beaten well together.

A Cathartic pill, causing watery evacuations.

Dose—5 to 10 grs.

**CAMPHORA** (Camphor)—Lauraceæ.

A volatile oil, in translucent, white, crystalline masses, obtained from the wood of Camphora officinarum, from China and Japan, and purified by sublimation in England.

A diffusible Stimulant and Antispasmodic.

Dose—1 to 10 grs., in pill.

In addition to the preparations bearing the name, camphor enters into Ungt. Plumbi Subacetatis Co., Ungt. Hydrarg. Co., and into 12 of the 16 liniments in the Pharmacopœia.

**Aqua Camphoræ.** About ½ gr. in 1 oz.

Water flavoured with camphor. Prepared by immersing ½ oz. camphor, tied in muslin, in 1 gallon water.

Only a vehicle for more active remedies.

**Linimentum Camphoræ.** 1 in 5.

A yellow oily liquid, prepared by dissolving 1 oz. camphor in 4 oz. olive oil.

A Stimulating application in chronic painful affections.

**Linimentum Camphoræ Compositum.** 1 *to* 8.

A faintly yellowish liquid, prepared by dissolving 2¼ oz. camphor in 15 oz. rectified spirit, and adding 1 dr. oil of lavender and 5 oz. strong solution of ammonia.

A safe and effectual Rubefacient and Counter-irritant.

In absence of other remedies, it may be used as a general diffusible stimulant in 20 minim doses, largely diluted.

**Spiritus Camphoræ.** 1 in 10.

A colourless liquid, prepared by dissolving 1 oz. camphor in 9 oz. rectified spirit.

An agreeable method of giving the drug.

Dose—10 to 30 or 60 minims in emulsion.

**Tinctura Camphoræ Composita.** 1½ grs. camphor and 2 grs. opium in 1 oz.

A bright, sherry-coloured liquid, commonly known as Paregoric, prepared by macerating 40 grs. each opium and benzoic acid with 30 grs. camphor and 30 minims oil of anise in 1 pint proof spirit.

Narcotic, Anodyne, and Expectorant.

Dose—15 to 60 minims.

**CANELLÆ ALBÆ CORTEX** (Canella Alba Bark)—Canellaceæ.

The nearly white bark, in quills or curved pieces, of Canella alba, from the West Indies, with clove-like odour and peppery taste.

An Aromatic Tonic, introduced to flavour Vinum Rhei.

Dose—10 to 30 grs., in powder.

**CANNABIS INDICA** (Indian Hemp)—Urticaceæ.

The dried flowering tops of the female plant of Cannabis sativa (Indian hemp); imported from India in elongated, compressed bundles; of a greenish brown colour, in which may be recognised the flowers, young branches, smaller leaves, and the well-known fruit commonly called hemp seeds.

Anodyne and Narcotic.

**Extractum Cannabis Indicæ.**

A rich, green resinous extract, prepared from the tops by macerating in spirit, and evaporating the tincture thus formed.

Anodyne and Narcotic, like Opium.

Dose—¼ to 1 grain, in pill.

**Tinctura Cannabis Indicæ.** 1 oz. to 1 pint.

A deep green liquid, prepared by dissolving 1 oz. of the extract in one pint rectified spirit.

Dose—5 to 20 minims, in mucilage or wine, as water decomposes the extract, throwing down the resin.

Action as above.

**CANTHARIS** (Cantharides)—Coleoptera.

The dried beetle Cantharis vesicatoria of the order Coleoptera, ¾ inch long, with bright metallic green wing covers; collected in Hungary.

Vesicant, Counter-irritant, and Diuretic.

**Acetum Cantharidis.** 1 in 10.

A dark brown coloured liquid, prepared from 2 oz. cantharides by digestion and percolation with 18 oz. acetic acid and 2 oz. glacial acetic acid.

Epispastic. Not used internally.

**Emplastrum Cantharidis.** 1 in 3.

A brownish substance, of the consistence of firm ointment, with dark green shining particles, prepared by heating 12 oz. cantharides (in powder), 7½ oz. yellow wax, 7½ oz. suet, 3 oz. resin, and 6 oz. lard.

Rubefacient and Vesicant, applied in a thin layer on adhesive plaster. Generally blisters in from 6 to 9 hours.

**Emplastrum Calefaciens.** 1 in 24.

Warm Plaster, prepared by adding to a strong infusion of 4 oz. of cantharides, 4 oz. each of expressed oil of nutmeg, yellow wax and resin, 3¼ lbs. soap plaster, and 2 lbs. resin plaster previously heated, making a firm plaster of a yellow colour.

A mild Stimulating application.

**Tinctura Cantharidis.** ¼ oz. to 1 pint.

A pale straw-coloured liquid, prepared by macerating ¼ oz. cantharides in 1 pint proof spirit.

Diuretic and Stimulant to the genito-urinary organs.

Dose—5 to 20 minims diluted with a mucilaginous liquid.

**Unguentum Cantharidis.** 1 in 7.

An ointment of a yellowish brown colour, prepared by heating 1 oz. cantharides in 6 oz. olive oil, and, after straining out the cantharides, adding 1 oz. yellow wax to the heated oil.

Milder than Emplastrum Cantharidis.

**Charta Epispastica** (Blistering Paper).

White paper coated on one side with a mixture made by heating together white wax, 4 oz.; spermaceti, 1½ oz.; olive oil, 2 oz.; resin, ¾ oz.; Canada balsam, ¼ oz.; cantharides, 1 oz.; with 6 oz. water.

Acts like Emplastrum Cantharidis.

**Liquor Epispasticus.** 1 in 2½. (Blistering Liquid.)

A bright, greenish brown, ethereal liquid, prepared by percolating 8 oz. cantharides, and 4 oz. acetic acid with 16 oz. ether.

Acts like Emplastrum, but more cleanly and rapid in its action.

**CAPSICI FRUCTUS** (Capsicum Fruit)—Solanaceæ.

A small, oblong, orange pod, containing flat white seeds, the fruit of Capsicum fastigiatum, known as Cayenne pepper.

A powerful Stimulant and Rubefacient, without raising the cuticle.

Dose—½ to 1 grain. 30 grs. may be given in a bolus in Delirium Tremens.

**Tinctura Capsici.** ¾ oz. to 1 pint.

A pale, brandy-coloured liquid, prepared by the percolation of ¾ oz. capsicum fruit with 1 pint rectified spirit.

Dose—10 to 20 minims diluted. As a gargle in relaxed throat, 1 dram in 10 oz. Infusion of Roses.

**CARBO ANIMALIS** (Animal Charcoal or Bone Black).

The residue of bones which have been exposed to a red heat without the access of air, consisting of charcoal and phosphate and carbonate of lime.

**Carbo Animalis Purificatus.**

A black powder, prepared by depriving animal charcoal or bone black of its salts, by digestion in hydrochloric acid.

Chiefly employed as a Deodoriser and Bleacher, and recommended as an Antidote in poisoning by alkaloids.

Dose—20 to 60 grains.

**CARBO LIGNI** (Wood Charcoal).

In black, brittle, porous masses, prepared by charring wood in a confined space without access of air.

Deodoriser and Absorbent in fetid eructations, or sprinkled over foul sores.

Dose—20 to 60 grs., in water.

**Cataplasma Carbonis.** 1 in 28.

A poultice, made of powdered charcoal, ½ oz.; crumb of bread, 2 oz.; linseed meal, 1½ oz.; and boiling water, 10 oz.

**CARDAMOMUM** (Cardamoms)—Zingiberaceæ.

The dried, pale brown, oblong, triangular capsules, containing the small angular brown seeds of Elettaria Cardamomum, from Malabar. The seeds only should be used.

Carminative, Tonic, Antispasmodic.

Dose—In powder, 5 to 20 grs.

**Tinctura Cardamomi Composita.** ¼ oz. to 1 pint.

A bright red liquid, prepared by percolating ¼ oz. cardamom seeds, ¼ oz. caraway fruit, 2 oz. raisins, ½ oz. cinnamon, 60 grs. cochineal, with 1 pint proof spirit.

An agreeable carminative, but chiefly used for its flavour, and bright red colour as an addition to draughts and mixtures.

Dose—½ to 2 drams in water.

In addition to the tincture, cardamom seeds enter into the following :—Ext. Col. Co., Pulv. Cinnam. Co., Pulv. Cretæ Arom., Tr. Gent. Co., Tr. Rhei, Vin. Aloes; and the Tincture itself enters into Dec. Aloes Co., Mist. Ferri Aromat., Mist. Sennæ Co., and Tr. Chloroformi Co.

**CARUI FRUCTUS** (Caraway Fruit)—Umbelliferæ.

Minute brown seed-like fruits, tapering at each end, and marked with five ridges, from Carum Carui, cultivated in England and Germany.

Carminative, Stimulant, and Antispasmodic.

In Confect. Opii, Confect. Piperis., Pulv. Opii Co., Tr. Card. Co. and Tr. Sennæ.

**Aqua Carui.** 1lb. to 1 gallon.

A colourless water, prepared by distilling 1 gallon of water from 1 lb. of caraway fruit, and 2 gallons of water.

Dose—1 to 2 oz.

**Oleum Carui.**

The faint yellow oil distilled in Britain from caraway fruit.
Dose—1 to 3 minims, on sugar.

IN—Confectio Scammonii and Pilula Aloes Barb.

**CARYOPHYLLUM** (Cloves)—Myrtaceæ.

The dried, unexpanded flower buds of Caryophyllus aromaticus (the clove tree); with a cylindrical body and spherical head, and four teeth, from Amboyna and Penang.

Carminative, Stimulating Aromatic, and Tonic.

IN—Infus. Aurant. Co., Mist. Ferri Aromat., and Vin. Opii.

**Infusum Caryophylli.** ¼ oz. to ½ pint (½ hour).
Prepared by infusing ¼ oz. cloves in 10 oz. boiling water.
Dose—1 to 4 oz.

**Oleum Caryophylli.**

The clear, yellowish oil distilled in Britain from cloves.
Dose—2 to 5 minims, on sugar.

IN—Confect. Scammonii, Pil. Col. Co. and Pil. Col. Co. et Hyoscyami.

**CASCARILLÆ CORTEX** (Cascarilla Bark)—Euphorbiaceæ.

The bark, in small, dull brown quills, coated with lichens of Croton Eluteria, from the Bahama Islands.

An Aromatic Bitter Tonic.

**Infusum Cascarillæ.** 1 oz. to ½ pint (1 hour).

Prepared by infusing 1 oz. cascarilla, bruised, in 10 oz. boiling water.

Dose—1 to 2 oz.

**Tinctura Cascarillæ.** 2½ oz. to 1 pint.

A dark brown liquid, prepared by the percolation of 2½ oz. of cascarilla, bruised, with 1 pint proof spirit.

Dose—½ to 2 drams, diluted.

**CASSIÆ PULPA** (Cassia Pulp)—Leguminosæ.

The soft, sweet, brown pulp (with shining seeds) of the pods of Cassia Fistula, from the East or West Indies.

Laxative. Used as an addition to senna in Confectio Sennæ.

**CASTOREUM** (Castor).

The brown, fig-shaped, dried follicles from the prepuce of the beaver, Castor Fiber, order Rodentia, from Hudson's Bay Territory.

A Stimulating Antispasmodic.

Dose—5 to 10 grs.

**Tinctura Castorei.** 1 oz to 1 pint.

A deep red liquid, prepared by macerating 1 oz. castor in 1 pint rectified spirit.

Dose—½ to 1 dram, in hysterical affections.

**CATECHU PALLIDUM** (Pale Catechu)—Cinchonaceæ.

Hard cubes (an inch in diameter, brown externally, yellow internally) of the extract of the leaves and young shoots of Uncaria Gambir, prepared at Singapore.

A Tonic Astringent.

Dose—10 to 30 grs., in powder.

**Infusum Catechu.** 160 grs. to ½ pint (½ hour).

Prepared by infusing 160 grs. catechu and 30 grs. cinnamon in 10 oz. boiling water.

Dose—1 to 2 oz. As all the catechu preparations contain so much tannin, they cannot be given with any preparation of iron.

**Tinctura Catechu.** 2½ oz. to 1 pint.

A rich coffee-brown liquid, prepared by macerating 2½ oz. of pale catechu and 1 oz. cinnamon in 1 pint proof spirit.

Dose—½ to 2 drams. A safe Astringent for children; dose, 5 to 10 minims for a child 1 year old.

**Pulvis Catechu Compositus.** 1 in 2½.

A reddish-brown powder, consisting of catechu 4 oz.; kino and rhatany, of each 2 oz.; cinnamon and nutmeg, of each 1 oz.

A Tonic Astringent, in chronic diarrhœa.

Dose—20 to 40 grs.; for a child 1 year old, 2 to 5 grs., in sugar.

**Trochisci Catechu.** 1 gr. in each lozenge.

Brownish lozenges, consisting of—catechu, 720 grs.; sugar, 25 oz.; gum acacia, 1 oz.; mucilage of gum acacia, 2 oz.; water q.s., divided into 720 lozenges.

Local Astringent for relaxed throat.

Dose—1 to 6 lozenges.

**CERA ALBA** (White Wax).

Yellow wax, bleached; in nearly white, translucent masses or cakes.

IN—Charta Epispastica, Tannin, Compound Lead, Mercury and Morphia Suppositories, Spermaceti, Compound Lead, and simple Ointments.

**CERA FLAVA** (Yellow Wax). Hymenoptera.

The prepared honey-comb of the hive bee, Apis mellifica, in firm, yellow masses.

Used chiefly as a basis for ointments and plasters, and it enters into the composition of 7 ointments, 5 plasters, and Pil. Phosphori.

**CEREVISIÆ FERMENTUM** (Barm, or Beer Yeast).

The viscid, semi-fluid, frothy fungus obtained in brewing beer.

A Tonic Stimulant in low states of the system.

Dose—½ to 1 oz., in some flavoured water.

**Cataplasma Fermenti.**

Yeast poultice, prepared by mixing 6 oz. yeast with 6 oz. water at 100°, and 14 oz. wheaten flour.

A Stimulating Deodoriser to foul sores.

**CERII OXALAS** (Oxalate of Cerium). $CeC_2O_4$.

A white granular powder, obtained as a precipitate by mixing solutions of oxalate of ammonia and any soluble salt of cerium.

A Gastric Sedative. Like bismuth, given in the vomiting of pregnancy.

Dose—1 to 2 grs., in pill.

**CETACEUM** (Spermaceti).

Consisting of nearly pure cetine, in pearly lustrous masses, obtained from the head of the Sperm whale, Physeter macrocephalus, inhabiting the Pacific and Indian Oceans.

Internally Demulcent, and externally Emollient, though seldom administered.

IN—Charta Epispastica, and

**Unguentum Cetacei.** 1 in 5½.

A pearly-white ointment, prepared by melting together 5 oz. spermaceti, 2 oz. white wax, and 1 pint almond oil.

An Emollient dressing for sores or blisters.

**CETRARIA** (Iceland Moss)—Lichenes.

The leafy, crisp, brownish-white lichen, Cetraria Islandica, native of North of Europe.

**Decoctum Cetrariæ.** 1 oz. to 1 pint.

Prepared by boiling 1 oz. Iceland moss with 20 oz. of water for 10 minutes, and making the strained product measure 20 oz.

Demulcent and Nutritive Tonic.

Dose—2 to 5 oz.

**CHARTA EPISPASTICA.**—(See Cantharides.)

**CHIRATA** (Chiretta)—Gentianaceæ.

The entire plant, Ophelia Chirata, imported from India in brown bundles 3 feet long, consisting mainly of the stems, about the size of goose quills, with the opposite branches and panicled flowers.

A pure bitter Tonic, like gentian.

Dose—10 to 30 grs. of the powder, though seldom given in this form.

**Infusum Chiratæ.** ¼ oz. to ½ pint (½ hour).

Prepared by infusing ¼ oz. chiretta in 10 oz. water at 120°.

Dose—1 to 2 oz.

**Tinctura Chiratæ.** 2½ oz to 1 pint.

A tea coloured liquid, prepared by the percolation of 2½ oz. chiretta with 1 pint proof spirit.

Dose—½ to 2 drams.

**CHLORAL HYDRAS** (Hydrate of Chloral). $C_2HCl_3O$.

In colourless crystals, prepared by the action of dry chlorine gas on alcohol, and the chloral thus produced purified by sulphuric acid and lime, and converted into the hydrate by the addition of water.

Hypnotic and Sedative.

Dose—10 to 30 grs., in flavoured water with syrup.

**Syrupus Chloral.** 10 grs. in 1 dr.

A colourless syrup, prepared by dissolving 80 grs. hydrate of chloral in 4 drs. of water, and adding simple syrup to 1 oz.

Dose—½ to 2 drs.

**CHLORINE** (Cl.)

Only used in following forms:—

**Liquor Chlori.**

Chlorine gas dissolved in water, forming a yellowish green liquid, prepared by acting on the black oxide of manganese with hydrochloric acid, and allowing the gas to pass through water.

Antiseptic and Deodorant. Recommended in fevers, and as a gargle for ulcerated throat.

Dose—10 to 20 minims, diluted.

**Vapor Chlori.**

2 oz. chlorinated lime put into an inhaler and moistened with cold water, so that the vapour may be inhaled.

For other preparations of Chlorine, see under "Soda" and "Calcium."

**CHLOROFORMUM** (Chloroform). $CHCl_3$.

A limpid, colourless liquid, prepared by distilling diluted alcohol with lime and chlorinated lime, and purifying the crude chloroform by washing with water and sulphuric acid, and by distillation with lime and chloride of calcium.

Sedative, Narcotic, Anodyne, either swallowed or inhaled. Externally, a Vesicant or Rubefacient or Anodyne, according to the strength of the application.

Dose—3 to 10 minims, freely diluted with water.

**Aqua Chloroformi.** 1 in 200.

A colourless solution of 1 dram of chloroform in 25 oz. of distilled water.

Used chiefly as a vehicle for more active preparations.

Dose—½ to 2 oz.

**Linimentum Chloroformi.** 1 in 2.

A pale, yellow liquid, prepared by mixing 2 oz. chloroform with 2 oz. camphor liniment.

Rubefacient and Anodyne.

**Spiritus Chloroformi.** 1 in 20.

A colourless liquid, prepared by dissolving 1 oz. chloroform in 19 oz. rectified spirit.

Dose—20 to 60 minims, in water.

**Tinctura Chloroformi Composita.** 1 in 10.

A brilliant red liquid, prepared by mixing 2 oz. chloroform, 8 oz. rectified spirit, and 10 oz. compound tincture of cardamoms.

An agreeable form for administering chloroform.

Dose—20 to 60 minims.

**CINCHONÆ FLAVÆ CORTEX** (Yellow Cinchona Bark) —Cinchonaceæ or Rubiaceæ.)

The yellowish-brown, fibrous, flat, heavy pieces of the bark of Cinchona Calisaya, from Southern Peru. Powder, cinnamon-brown.

100 grs. should yield 2 grs. of pure quinia.

Antiperiodic, Tonic, Febrifuge, and Astringent.

Dose in powder, 10 to 60 grs.

**Decoctum Cinchonæ Flavæ.** 1¼ oz. to 1 pint.

A reddish, muddy liquid, prepared by boiling 1¼ oz. yellow bark in 1 pint distilled water, for 10 minutes, straining when cold, and making the strained product to measure 1 pint.

Dose—1 to 2 oz. Mixtures containing it require to be shaken up before being used.

**Extractum Cinchonæ Flavæ Liquidum.** 4 in 1.

A deep brown liquid, prepared by exhausting 1 lb. yellow cinchona bark with distilled water by percolation, evaporating the liquid thus obtained from 12 pints to 3 oz., and adding 1 oz. rectified spirit.

Dose—10 to 30 minims. 1 oz. of the liquid represents 4 oz. bark.

**Infusum Cinchonæ Flavæ.** ½ oz. to 10 oz. (2 hours).

Prepared by infusing ½ oz. yellow cinchona bark with 10 oz. boiling distilled water.

Dose—1 to 2 oz.

**Tinctura Cinchonæ Flavæ.** 4 oz. to 1 pint.

A reddish-brown liquid, prepared by the percolation of 4 oz. yellow cinchona bark with 1 pint proof spirit.

Dose—½ to to 2 drams.

**CINCHONÆ PALLIDÆ CORTEX** (Cinchonaceæ or Rubiaceæ).

Pale Cinchona bark, in thin, brittle quills; externally light brown, speckled with grey lichens, internally cinnamon-brown; of Cinchona Condaminea, from Ecuador. Powder, pale brown.

100 grs. contain ½ gr. of alkaloids, mostly quinia.

Action same as yellow bark, but weaker.

IN—Tinct. Cinchonæ Co. and Mist. Ferri. Aromat.

**Tinctura Cinchonæ Composita.** 2 oz. to 1 pint.

A dark reddish-yellow liquid, prepared by the percolation of pale cinchona bark 2 oz., bitter-orange peel 1 oz., serpentary root ½ oz., saffron 60 grs., and cochineal 30 grs., with proof spirit 1 pint.

Dose—½ to 2 drs.

**CINCHONÆ RUBRÆ CORTEX** (Cinchonaceæ, or Rubiaceæ).

Red Cinchona Bark, from Cinchona succirubra collected on Chimborazo. In flat, thick, heavy pieces, reddish-brown externally, internally redder. Powder is reddish-brown in colour. Acts like the pale and yellow barks.

100 grs. yield 1·5 grs. of alkaloids.

☞ The student can readily distinguish the flat pieces of *yellow* bark by the absence of the epidermis; the *pale* by the presence of the lichens; and the dense, heavy *red* bark by its having the periderm present, being often warty, and crossed by transverse cracks.

Cascarilla bark resembles the pale variety. It is distinguished by the shortness and broken-up state of its quills, which are much smaller and more brittle than those of pale Cinchona, and they have an agreeable aromatic odour and warm taste.

**CINNAMOMI CORTEX** (Cinnamon Bark)—Lauraceæ.

In light yellowish-brown, closely-rolled, very thin quills, being the inner bark of the young shoots of Cinnamomum zeylanicum from Ceylon.

A Stimulating Aromatic and Stomachic.

Dose—10 to 60 grs. in powder. It enters, on account of its aroma, into nearly a score of preparations.

**Aqua Cinnamomi.** 20 oz. to 1 gallon.

A colourless water, prepared by distilling 1 gallon from 20 oz. cinnamon and 2 gallons water.

Dose—1 to 2 oz.

IN—Mist. Cretæ, Mist. Guaiaci, and Mist. Spt. Vini Gallici.

**Oleum Cinnamomi.**

The fresh yellow oil distilled from Cinnamon bark, becoming red with age. It sinks in water.

Dose—2 to 5 minims on sugar or in mucilage.

**Pulvis Cinnamomi Compositus.** 1 in 3.

A pale brown powder, consisting of cinnamon, cardamoms, and ginger—of each 1 oz.

Dose—3 to 10 grs.

IN—Pil. Aloes et Ferri and Pil. Cambogiæ Co.

**Tinctura Cinnamomi.** 2½ oz. to 1 pint.

A reddish brown liquid, prepared by percolating 2½ oz. of cinnamon with 1 pint proof spirit.

Dose—½ to 2 drams; for a child 1 year old 5 minims, on sugar.

In addition to the above preparations, cinnamon enters into Acid. Sulph. Aromat., Decoct. Hæmatoxyli, Infus. Catechu and Vin. Opii; 4 compound powders—*i.e.*, catechu, kino, chalk, and cinnamon; and 4 tinctures—*i.e.*, cardamoms, catechu, cinnamon, and lavender.

**COCCUS** (Cochineal)—Hemiptera.

The greyish-white wrinkled, oval, dried female insect Coccus Cacti, from Mexico, resembling a seed of quaking grass.

Used as a rich red, harmless, colouring agent. Is sometimes given in Pertussis.

IN—Tr. Card. Co., Tr. Cinch. Co., and

**Tinctura Cocci.** 2½ oz. to 1 pint.

A carmine coloured liquid, prepared by *macerating* 2½ oz. cochineal insects in 1 pint proof spirit.

Dose—½ to 2 drs.

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**COLCHICI CORMUS** (Colchicum Corm)—**Melanthaceæ.**

The fresh bulb (about the size of a chestnut) of Colchicum autumnale—meadow saffron, and the same in thin, white, dried, kidney-shaped slices. Collected about the end of June.

Diuretic, Purgative, and Cardiac Sedative. Used in gout.

Dose—2 to 8 grs., in powder.

**Extractum Colchici.**

A soft, brownish black extract, prepared by evaporating the juice of the fresh corm.

Dose—½ to 2 grs., in pill.

**Extractum Colchici Aceticum.**

A very soft, brownish black extract, prepared by evaporating the juice of fresh corms, to which about $\frac{1}{20}$th of their weight of acetic acid has been added.

Dose—½ to 2 grs., in pill.

**Vinum Colchici.** 4 oz. to 1 pint (11 grs. in 1 dram).

A slightly muddy, tea-coloured liquid, prepared by macerating 4 oz. dried colchicum corm in 1 pint sherry.

Dose—10 to 30 minims.

**COLCHICI SEMINA** (Colchicum Seeds)—Melanthaceæ.

The small, hard, globular, reddish-brown, ripe seeds of Colchicum autumnale.

Action like the corm, but not so likely to lose their properties by drying.

**Tinctura Colchici Seminum.** 2½ oz. to 1 pint.

A brown, sherry-coloured liquid, prepared by percolating 2½ oz. colchicum seeds with 1 pint proof spirit.

Dose—10 to 30 minims.

**COLLODIUM** (Collodion). 1 in 48.

A colourless syrupy liquid, consisting of a solution of 1 oz. pyroxylin (gun-cotton) in 36 oz. ether and 12 oz. rectified spirit.

Protective to wounds.

**Collodium Flexile** (Flexible Collodion).

A colourless syrupy liquid, prepared by dissolving 120 grs. Canada balsam and 1 dram castor oil in 6 oz. collodion.

Acts similarly to collodion, but less liable to crack on drying.

**COLOCYNTHIDIS PULPA** (Colocynth Pulp)—Cucurbitaceæ.

The dried, spongy, light pulp of Citrullus Colocynthis—the bitter apple—the hard yellow rind and the seeds (resembling apple pips) being rejected. From Southern Europe.

A Hydragogue Cathartic.

Dose—2 to 8 grs., in pill.

**Extractum Colocynthidis Compositum.** 1 in 4½.

A firm, blackish mass, prepared by exhausting 6 oz. colocynth pulp with 1 gallon of proof spirit, and, after the volatile spirit is distilled from the resulting tincture, 12 oz. extract of Socotrine aloes, 4 oz. resin of scammony, 3 oz. hard soap, and 1 oz. cardamoms, all in fine powder, are added, and the evaporation continued till a pilular consistence is reached.

Purgative. Acts like Pil. Colocy. Co.

Dose—3 to 10 grs., in pill. 4 grs. will contain the active principle of nearly 1 grain of colocynth pulp.

**Pilula Colocynthidis Compositæ.** 1 in 6.

Prepared by beating together 1 oz. colocynth pulp, 2 oz. Barbadoes aloes, 2 oz. scammony, ¼ oz. sulphate of potash, and 2 drs. oil of cloves, with q.s. distilled water. Resembles in appearance the extract, from which it is distinguished by the smell of cloves.

Dose—5 to 10 grs.

**Pilula Colocynthidis et Hyoscyami.** 1 and 3 in 9.

Prepared by adding 1 oz. extract of hyoscyamus to 2 oz. colocynth pill.

Dose—5 to 10 grs. Not so liable to gripe as Pil. Col. Co.

**CONII FOLIA** (Hemlock Leaves)—Umbelliferæ.

The finely-divided, smooth, *fresh* leaves and young branches of the Spotted Hemlock, Conium maculatum. Also, the deep green dried leaves separated from the branches, grown in Britain. The stems are smooth and marked with purple spots.

Anodyne, Narcotic, Sedative.

Dose—2 to 6 grs., in powder or pill.

**Cataplasma Conii.** 1 in 14.

Prepared by adding 1 oz. hemlock leaf in powder and 3 oz. linseed meal to ½ pint boiling water.

Anodyne.

**Extractum Conii.**

The green extract prepared by the evaporation of fresh hemlock juice from the leaves and branches.

Dose—2 to 6 grs. in pill. If combined with an alkali or surrounded by chalk powder, pills with hemlock give out the stinking odour of mice.

**Pilula Conii Composita.** 2½ in 3.

Prepared by mixing 2½ oz. extract of hemlock, ½ oz. ipecacuanha, and adding treacle q.s.

Dose—5 to 10 grs., as above.

**Succus Conii.**

A brownish liquid, consisting of the juice of hemlock leaves, to which ⅓rd of rectified spirit is added.

Dose—½ to 1 dram.

**Vapor Coniæ** (Inhalation of Conia).

Extract of hemlock 60 grs., liquor potassæ 1 dram, and distilled water 10 drs., mixed. 20 mins. poured on a sponge, and the vapour of water passed over it.

**CONII FRUCTUS** (Hemlock Fruit)—Umbelliferæ.

The small, seed-like, greyish fruit, with 5 waved ridges, of the spotted hemlock.

Action like the leaves.

**Tinctura Conii.** 2½ oz. to 1 pint.

A brownish liquid, prepared by percolating 2½ oz. of the fruit with 1 pint of proof spirit.

Dose—20 to 60 minims.

**COPAIBA** (Copaiva) from Leguminosæ.

The thick, yellow fluid oleo-resin, obtained from incisions in the trunk of Copaifera multijuga, from the Amazon Valley.

Stimulant to mucous membranes, especially to the urinary passages.

Dose—½ to 1 dram, in emulsion, with 2 drams mucilage or 15 minims liquor potassæ; commonly given in capsules, ¼th dram in each.

**Oleum Copaibæ.**

The colourless or pale yellow oil distilled from copaiva.

Dose—5 to 20 minims, as above.

**CORIANDRI FRUCTUS** (Coriander Fruit)—Umbelliferæ.

The small, globular, ribbed, yellowish-brown, seed-like fruit of Coriandrum sativum; grown in Britain.

An Aromatic, Stimulating Antispasmodic.

Dose—10 to 60 grs., in powder.

IN—Confect. Sennæ, Mist. Gentianæ, Syr. Rhei, Tinct. Rhei, and Tinct. Sennæ.

**Oleum Coriandri.**

The yellowish oil of Coriander ; distilled from the fruit in Britain.

Dose—1 to 4 minims, on sugar or in emulsion.

IN—Syrupus Sennæ.

**CREASOTUM** (Creasote).

A colourless or pale yellow oily liquid, a product of the distillation of Wood Tar.

Sedative, Astringent, and Antiseptic. Externally Styptic.

Dose—1 to 3 minims, in pill.

**Mistura Creasoti.** 1 minim in 1 oz.

A nearly colourless mixture, consisting of creasote and glacial acetic acid 16 minims each, spirit of juniper ½ dram, syrup 1 oz., and distilled water 15 oz.

Dose—1 to 2 oz.

**Unguentum Creasoti.** 1 in 9.

A yellowish-white or cream coloured ointment, prepared by mixing 1 dr. creasote and 1 oz. simple ointment.

**Vapor Creasoti.** 12 minims in 8 oz.

12 minims of creasote mixed in a suitable apparatus with 8 oz. boiling water.

**CRETA** (Chalk). $CaCO_3$.

Native friable carbonate of lime.

**CRETA PRÆPARATA** (Prepared Chalk). $CaCO_3$.

In little conical masses, or as an almost amorphous white powder, freed from its impurities by washing.

Antacid and mildly Astringent.

Dose—10 to 60 grs., in powder or with syrup.

IN—Hydrarg. cum Creta 2 in 3, and in

**Mistura Cretæ.** ¼ oz. to 8 oz.

A white milky mixture, prepared by rubbing up ¼ oz. prepared chalk, ¼ oz. powdered gum acacia, ½ oz. syrup, in 7½ oz. cinnamon water.

Dose.—1 to 2 oz. For a child 1 year old 1 to 2 drs.

**Pulvis Cretæ Aromaticus.** 1 in 4 (nearly).

A pale brown powder, consisting of cinnamon, nutmeg, saffron, cloves, cardamoms, sugar, and chalk, 4. 3. 3. 1½. 1. 25. 11.

An Aromatic Astringent.

Dose—10 to 60 grs.

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**Pulvis Cretæ Aromaticus cum Opio.** 1 in 40 of opium.

A pale brown powder, prepared by mixing 9¾ oz. of aromatic powder of chalk with ¼ oz. powdered opium.

Aromatic, Astringent, and Narcotic.

Dose—10 to 40 grs.; for a child 1 year old 1 gr.

**CROCUS** (Saffron)—Iridaceæ.

The dried thread-like styles, each terminated by three deep orange stigmas of Crocus sativus, from Spain, France, and Italy.

Supposed to be Emmenagogue, but only used for its colouring properties.

**IN—Decoct. Aloes Co., Pil. Aloes et Myrrhæ, Pulv. Cretæ Aromat., Tinct. Cinch. Co., Croci, Opii Ammon., and Rhei.**

**Tinctura Croci.** 1 oz. to 1 pint.

A bright yellowish brown liquid, prepared by percolating 1 oz. saffron with 1 pint proof spirit.

Dose—½ to 2 drs.

**CROTONIS OLEUM** (Croton Oil)—from Euphorbiaceæ.

The brownish-yellow oil *expressed* from the seeds of Croton Tiglium, a native of India.

A powerful hydragogue cathartic, acting generally within 1 or 2 hours.

Dose—½ to 1 minim in pill, or on dry sugar where swallowing is difficult.

**Linimentum Crotonis.** 1 in 8.

A green liquid, consisting of croton oil 1 oz., oil of cajuput and rectified spirit, of each 3½ oz.

Rubefacient and Counter-irritant.

**CUBEBA** (Cubebs)—Piperaceæ.

The globular, dried, unripe fruit of Cubeba officinalis, about the size and colour of black pepper, with a stalk attached to it; cultivated in Java.

Stimulant to mucous surfaces, but particularly the genito-urinary.

Dose in gonorrhœa—½ to 2 drs., in powder given in milk.

**Oleum Cubebæ.**

Pale greenish-yellow oil, distilled from cubebs in Britain.

Dose—5 to 20 minims, in emulsion with mucilage.

**Tinctura Cubebæ.** 2½ oz. to 1 pint.

A clear sherry-coloured liquid, prepared by percolating 2½ oz. cubebs with 1 pint *rectified* spirit.

Dose—½ to 2 drs.

**CUPRUM.** Cu. Fine Copper Wire, about No. 25.

Used in preparing Spt. Æther. Nitrosi.

**Cupri Sulphas.** $CuSO_4$.

A blue crystalline salt in oblique prisms, obtained by dissolving copper in sulphuric acid, and purifying by recrystallising.

Astringent, Tonic, and Emetic.

Dose—As an Astringent, ¼ gr. to 2 grs. in pill; as an Emetic, 5 to 10 grs. in solution in water.

**CUSPARIÆ CORTEX** (Angustura or Cusparia Bark)—Rutaceæ.

In straight incurved pieces, bevelled at the edges, with mottled brown epidermis, from Galipea Cusparia, South America.

A bitter Stimulating Tonic.

Dose—10 to 30 grs., in powder.

**Infusum Cuspariæ.** ½ oz. to ½ pint (2 hours).

Prepared by infusing ½ oz. of Cusparia bark in ½ pint of distilled water at 120°.

Dose—1 to 2 oz.

**CUSSO** (Kousso)—Rosaceæ.

The flowers and tops of Brayera anthelmintica in compressed clusters; the small flowers are reddish-brown, on hairy stalks, with calyx five-parted.

Anthelmintic for *tænia solium.*

Dose—¼ to ½ oz.

**Infusum Cusso.** ½ oz. to 8 oz. (¼ hour).

Kousso ½ oz., infused in 8 oz. boiling distilled water.

Dose—4 to 8 oz., without straining.

**DIGITALIS FOLIA** (Digitalis Leaves)—Scrophulariaceæ.

The large, wrinkled, downy, dried leaves, with bluntly serrated edges, of Digitalis purpurea (Purple Foxglove). From wild indigenous plants when about two-thirds of the flowers are expanded.

Diuretic and Cardiac Tonic.

Dose—½ to 1½ grs., in pill.

**Infusum Digitalis.** 3 grs. to 1 oz. (1 hour).

Prepared by infusing 30 grs. of digitalis leaf in 10 oz. boiling distilled water.

Dose—2 to 4 drams.

**Tinctura Digitalis.** 2¼ oz. to 1 pint.

A dark-brown liquid, prepared by percolating 2¼ oz. digitalis leaf with 1 pint proof spirit.

Dose—10 to 30 minims. 4 drs. may be given in Delirium Tremens.

**Digitalinum** (Digitalin).

The active principle of Digitalis. In porous masses or small white scales, prepared by adding tannin to an acidulated alcoholic extract of digitalis, and rubbing up the resulting tannate of digitalin with oxide of lead, and purifying with spirit.

Dose—$\frac{1}{60}$ to $\frac{1}{30}$ gr.; should be given with great caution.

**DULCAMARA** (Bitter-Sweet)—Solanaceæ.

The dried, hollow, cylindrical young branches of Solanum Dulcamara. Bitter-sweet or woody nightshade. Gathered in autumn from indigenous plants which have shed their leaves.

An almost inert Narcotic; accredited with Diuretic and Alterative properties.

**Infusum Dulcamaræ.** 1 oz. to ½ pint (1 hour).

Prepared by infusing 1 oz. bitter-sweet in 10 oz. boiling distilled water.

Dose—1 to 2 oz. Seldom used.

**ECBALII FRUCTUS** (Squirting Cucumber Fruit)—Cucurbitaceæ.

The fruit (resembling a small hairy cucumber) of Ecbalium Officinarum, the Squirting Cucumber. Grown in Britain.

**ELATERIUM** (Elaterium).

A sediment in thin, friable, greenish-grey curved cakes, obtained by collecting the deposit which settles down from the juice of the squirting cucumber.

A drastic Hydragogue Cathartic.

Dose—$\frac{1}{16}$ to ½ gr., in powder or in pill.

**Pulvis Elaterii Compositus.** 1 in 10.

A dirty white powder, consisting of elaterium 10 grs., sugar of milk 90 grs.

Dose—½ to 5 grs., in pill or powder.

**ELEMI** (Elemi)—Terebinthaceæ or Amyridaceæ.

A concrete resinous exudation in yellowish-white adhesive masses, probably from Canarium commune. From Manilla.

A Stimulating Rubefacient, and used only externally.

**Unguentum Elemi.** 1 in 5.

A dirty, yellowish-white ointment, prepared by melting together ¼ oz. elemi and 1 oz. simple ointment, and straining; sometimes called the Balm of Arcæus.

**Emplastrum Calefaciens.**—(See under Cantharis.)

**ERGOTA** (Ergot)—Graminaceæ.

Ergot is the diseased seed or grain of the rye, Secale cereale, caused by the spawn of Claviceps purpurea; in long, dark purple, brittle grains, pinkish-white internally.

Emmenagogue. Acting on the unstriped muscular fibre of the uterus and arteries.

Dose—10 to 40 grs. Seldom, however, given in powder.

**Extractum Ergotæ Liquidum.** 1 oz. in 1 oz.

A deep, coffee-brown liquid, obtained by extracting the oil from 16 oz. of ergot with 1 pint washed ether, making a strong infusion of the remainder in water at 160°, evaporating this to 8 oz. and adding 8 oz. rectified spirit.

Dose—10 to 30 minims, in water.

**Infusum Ergotæ.** ¼ oz. to 10 oz. (½ hour).

Prepared by infusing ¼ oz. ergot (bruised) in 10 oz. boiling distilled water.

Dose—1 to 2 oz.

**Tinctura Ergotæ.** 5 oz. to 1 pint.

A coffee brown liquid, prepared by percolating 5 oz. ergot with 1 pint proof spirit.

Dose—10 minims to 1 dram.

**Farina Lini.**—(See Lini Farina.)

**FARINA TRITICI** (Wheaten Flour)—Graminaceæ.

The grain of wheat, Triticum vulgare, ground and sifted; used in making Cataplasma Fermenti.

**FEL BOVINUM PURIFICATUM** (Purified Ox Bile)—The purified gall of the ox, Bos Taurus.

A dark-green, soft solid, prepared by mixing fresh bile or gall from the ox with rectified spirit, and evaporating the clear liquid.

Tonic and Aperient.

Dose—5 to 10 grs., in pill, or 30 grs. in bolus.

**FERRUM** (Iron)—Fe.

Wrought iron, in the form of wire or nails, free from oxide. The different preparations of this substance vary in their action. Pure iron, for example, acts simply as a Tonic and Hæmatic, or blood improver, while the acid preparations are generally powerful astringents as well. Iron forms a dark discoloured liquid when ordered with any of the bitter infusions, except those of Quassia and Calumba. The same remark applies to all astringent vegetable tinctures. Iron, like arsenic, should be prescribed after meals.

**Tinctura Ferri Acetatis.** 2½ oz. to 1 pint.

A brown changeable liquid, prepared by mixing 2½ oz. solution of the persulphate of iron with 8 oz. rectified spirit, and adding a solution of 2 oz. acetate of potash in 10 oz. rectified spirit, and filtering.

Dose—5 to 30 minims, in water.

**Ferri Arsenias.** $Fe_3As_2O_8$.

A green amorphous powder, prepared by mixing a solution of arseniate and acetate of soda with one of sulphate of iron, and drying the precipitate at a low temperature.

Resembles arsenic in its action, the amount of iron being so small its chalybeate action is not appreciable.

Dose—$\frac{1}{16}$ to ½ gr., in pill.

**Ferri Carbonas Saccharata.** 37 per cent. $FeCO_3$.

Saccharated Carbonate of Iron, consisting of carbonate and peroxide of iron, mixed with sugar. A greyish brown powder, cohering in little lumps, prepared by mixing solutions of carbonate of ammonia and sulphate of iron, washing the resulting carbonate, and rubbing it up with sugar.

Dose—5 to 20 grs.

**Pilula Ferri Carbonatis.** 1 in 1¼.

Prepared by beating together 1 oz. of saccharated carbonate of iron and ¼ oz. confection of roses.

Dose—5 to 20 grs.

**Mistura Ferri Composita.** 2½ grs. sulphate to 1 oz.

A muddy, green, changeable mixture, prepared by mixing myrrh and sugar, of each 60 grs., carbonate of potash 30 grs., spirit of nutmeg ½ oz., rose water 9½ oz., and sulphate of iron 25 grs. Commonly called Griffith's Mixture, and contains about 1 gr. carbonate of iron in each oz.

Hæmatic and Emmenagogue.

Dose—1 to 2 oz.

**Mistura Ferri Aromatica.** About 1 gr. of iron in 1 pint.

Commonly called *Heberden's Ink*, and contains *tannate* of iron as an inky precipitate. Prepared by macerating 1 oz.

pale cinchona bark, ½ oz. calumba, ¼ oz. cloves, ½ oz. iron wire, 3 oz. tincture of cardamoms, ½ oz. tincture of orange peel, and peppermint water to 16 oz.

Dose—1 to 2 oz.

**Ferri et Ammoniæ Citras.**

Citrate of Iron and Ammonia, in transparent ruby scales. Prepared by mixing solutions of persulphate of iron and ammonia, and dissolving the freshly precipitated peroxide of iron thus formed in solution of citric acid, and, after the addition of ammonia, evaporating.

Dose—5 to 10 grs.; a most agreeable tonic in solution with lemon or orange tincture.

**Vinum Ferri Citratis.** 8 grs. in 1 oz.

A brownish liquid, prepared by dissolving 160 grs. of citrate of iron and ammonia in 1 pint orange wine.

Dose—1 to 4 drams.

**Ferri et Quiniæ Citras.** 1 gr. Quinia in 6.

In greenish yellow scales, being a citrate of Quinia, Iron, and Ammonium. Prepared by dissolving the peroxide of iron (formed as in the last preparation) in citric acid, adding quinia (prepared by precipitating the sulphate by ammonia), neutralising with ammonia, and evaporating.

Hæmatic, Tonic, Antiperiodic.

Dose—5 to 10 grs., in solution or in pill.

**Ferri Iodidum.** $FeI_2$, with water of crystallisation and a little oxide

A greenish-brown, deliquescent, crystalline salt, prepared by boiling iodine and iron wire together in water, and evaporating.

In addition to the properties of iron, it acts like iodine, and is useful in scrofula and syphilis.

Dose—1 to 5 grs., in pill or in solution ; it is a very changeable preparation.

**Pilula Ferri Iodidi.** 1 in 3½.

Prepared by mixing 40 grs. iron wire, 80 grs. iodine, 50 minims distilled water, and adding 70 grs. sugar and 140 grs. liquorice, and beating all together.

Dose—3 to 8 grs. Should be dispensed in a bottle.

**Syrupus Ferri Iodidi.** 4·3 grs. $FeI_2$ in 1 dram.

A colourless syrup, prepared by heating 1 oz. iron wire and 2 oz. iodine with 3 oz. distilled water, and adding the filtered product to 28 oz. sugar dissolved in 10 oz. water.

Dose—½ to 1 dram. Flavoured with oil of lemon, it is easily administered to children. Dose for a child 1 year old, 3 minims.

**Ferri Oxidum Magneticum.** $Fe_3O_4$.

Magnetic oxide of iron combined with 20 per cent. water of hydration, and containing some peroxide of iron. A dark brownish black powder, prepared by boiling a solution of soda with a mixed solution of sulphate and persulphate of iron, and washing the precipitate.

Dose 5 to 10 grs., in powder or in pill.

**Ferri Peroxidum Humidum.** $Fe_2O_3$.

Hydrated peroxide of iron, with 86 per cent. uncombined water. A soft, moist, reddish brown mass, prepared by adding a solution of persulphate of iron to an excess of solution of soda, and washing the precipitate.

Introduced as an Antidote in Arsenical Poisoning. Should be made fresh, and given as soon as possible after the poison.

Dose—¼ to ½ oz.

**Ferri Peroxidum Hydratum.** $Fe_2O_3$.

A reddish brown powder, prepared by heating the moist peroxide below 212° till it ceases to lose weight.

Dose—5 to 30 grs., in powder.

**Emplastrum Ferri** (Iron, or Roborans Plaster). 1 in 11.

A solid, red plaster, consisting of hydrated peroxide of iron 1 oz., Burgundy pitch 2 oz., lead plaster 8 oz.

**Liquor Ferri Perchloridi Fortior.** 40 per cent.

A deep orange brown liquid, prepared by dissolving 2 oz. iron wire in 8 oz. hydrochloric acid and 8 oz. distilled water, and, after filtering, adding 9 drs. of nitric acid and 4 oz. more hydrochloric, and evaporating to 10 oz.

A powerful Astringent and Hæmostatic. Externally—Caustic.

**Liquor Ferri Perchloridi.** 1 in 4.

A brown liquid, prepared by mixing 5 oz. strong solution of perchloride of iron with 15 oz. distilled water.

Dose—10 to 30 minims, freely diluted.

**Tinctura Ferri Perchloridi.** 1 in 4.

A brown liquid, prepared by adding 5 oz. strong solution of perchloride of iron to 15 oz. rectified spirit.

Dose—10 to 30 minims, freely diluted.

**Liquor Ferri Pernitratis.** 13 per cent.

A reddish brown liquid, prepared by dissolving 1 oz. iron wire in 4½ oz. nitric acid and 25½ oz. distilled water.

Dose—10 to 40 minims, freely diluted.

**Liquor Ferri Persulphatis.** (See under Ferri Sulphas.)

**Ferri Phosphas.** $Fe_3P_2O_8$.

A slate-blue amorphous powder, prepared by mixing a solution of sulphate of iron with one of phosphate and acetate of soda, and drying the washed precipitate.

Dose—5 to 10 grs., in powder; generally given in the form of syrup.

**Syrupus Ferri Phosphatis.** 1 gr. in 1 dram.

A colourless syrup, prepared by dissolving fresh phosphate of iron, made as in last preparation, in diluted phosphoric acid and sugar.

Dose—1 dram diluted in anæmic dyspepsia.

**Ferri Sulphas.** $FeSO_4$.

Pale greenish-blue crystals, prepared by dissolving iron wire in diluted sulphuric acid, and after heating, allowing the salt to crystallise.

Tonic, Astringent, and Emmenagogue.

Dose—1 to 5 grs., in solution.

IN—Pil. Aloes et Ferri 1 in 7.

**Ferri Sulphas Exsiccata.** $FeSO_4$.

A greyish powder, prepared by heating the last preparation to 400°, and powdering the residue. 3 grs.=5 grs. Ferri Sulph.

Dose—1 to 3 grs., in pill.

**Ferri Sulphas Granulata.** $FeSO_4$.

In small granular crystals, of a pale greenish-blue, prepared by heating iron wire in diluted sulphuric acid, and filtering the solution into rectified spirit.

Dose—1 to 5 grs., in solution or in pill.

**Liquor Ferri Persulphatis.** $Fe_23SO_4$. 36½ per cent.

A dense dark-red solution of FERRIC sulphate, prepared by dissolving 8 oz. sulphate of iron in 6 drs. sulphuric acid and 10 oz. distilled water, and adding 6 drs. nitric acid in 2 oz. distilled water, and making up to 11 oz. after heating.

Styptic; introduced for the purpose of making six preparations of iron.

**Vinum Ferri.** 1 oz. to 1 pint.

A brownish-green liquid, prepared by *partially immersing* 1 oz. iron wire in 1 pint of sherry for a month.

Dose—1 to 4 drams; contains a small amount of iron, chiefly as tartrates, malates, and citrates.

**Ferrum Redactum**—(Reduced Iron). Fe and $Fe_3O_4$.

A black powder, consisting of metallic iron and a variable amount of magnetic oxide, prepared by passing Hydrogen over red-hot hydrated peroxide of iron in a gun-barrel.

Tonic, Hæmatic, Emmenagogue; sometimes called Quevenne's iron.

Dose—2 to 5 grs., in pill.

**Trochisci Ferri Redacti.** 1 gr. in each.

Greyish-black lozenges, consisting of reduced iron 720 grs., sugar 25 oz., gum acacia 1 oz., mucilage of gum acacia 2 oz., distilled water q.s., divided into 720 lozenges.

Dose—1 to 6.

**Ferrum Tartaratum** (Tartrate of Iron and Potash). $KFeOC_4H_4O_6$.

In deep garnet scales, prepared by dissolving freshly-precipitated peroxide of iron (deposited from the persulphate solution by ammonia) in solution of cream of tartar, and evaporating carefully.

Dose—5 to 10 grs. in solution in water.

**FICUS** (Fig)—Urticaceæ.

The dried fruit of the common Fig tree—Ficus Carica—from Smyrna.

Laxative; used in making Confectio Sennæ.

**FILIX MAS** (Male Fern)—Filices.

The dried, tufted, scaly, greenish-brown rhizome, with bases of the foot-stalks and root-fibres of Aspidium Filix mas. Collected in summer in Britain.

**Extractum Filicis Liquidum.**

A thick, dark-green, oily liquid, prepared by extracting the oleo-resinous matter from the male fern by percolating it with ether, and evaporating.

Anthelmintic; used to destroy the tapeworm.

Dose—15 to 30 minims, in emulsion with yolk of egg and sugar, and followed by a purgative.

**FŒNICULI FRUCTUS** (Fennel Fruit)—Umbelliferæ.

The pale-brown, eight-ribbed, seed-like, beaked fruit of Fœniculum dulce. From Malta.

Carminative, Antispasmodic, and Galactagogue.

**Aqua Fœniculi.** 1 lb. to 1 gallon.

A colourless water, obtained by distilling 1 gallon from 2 gallons of water and one pound fennel fruit.

Dose—1 to 3 oz. For a child one year old, one dram.

**GALBANUM** (Galbanum)—Umbelliferæ.

A fetid, greenish-yellow gum-resin, in small tears, agglutinated into masses, derived from unknown umbelliferous plants in India and the Levant.

An Antispasmodic and stimulating Expectorant, like Assafœtida and Ammonia.

Dose—2 to 5 grs., in pill, but seldom given.

**Emplastrum Galbani.** 1 in 11.

A yellow solid, consisting of galbanum, ammoniacum, and yellow wax, of each 1 oz., and lead plaster 8 oz.

Galbanum enters into Pil. Assafœtidæ Co.

**GALLA** (Galls) from Cupuliferæ.

A partially insect and partially vegetable production, growing as a round, hard tumour or excrescence on the oak (Quercus infectoria), and caused by the irritation arising from the punctures made by Diplolepis Gallæ tinctoriæ, an insect which deposits its ova in the young buds. From AsiaMinor.

Astringent. Generally given in the form of tannic or gallic acid—the active principle of galls.

**Tinctura Gallæ.** 2½ oz. to 1 pint.

A dark brown liquid, prepared by percolating 2½ oz. galls with 1 pint proof spirit.

Dose—½ to 2 drs.

**Unguentum Gallæ.** 80 grs. to 1 oz.

A pale brown ointment, prepared by rubbing 80 grs. powdered galls with 1 oz. benzoated lard.

Astringent. Chiefly used for hæmorrhoids.

**Unguentum Gallæ cum Opio.** 32 grs. to 1 oz.

A light brown ointment, prepared by mixing 32 grs. powdered opium with 1 oz. ointment of galls.

A Local Anodyne and Astringent application to painful hæmorrhoids.

**Gallic and Tannic Acids.** (See under Acidum Gallicum).

**GENTIANÆ RADIX** (Gentian Root)—Gentianaceæ.

The tough, wrinkled, or ringed brownish-yellow, dried root of Gentiana lutea; from Central Europe.

A pure Bitter Tonic, without astringency.

Dose—10 to 30 grs., in powder.

☞ This root is often confounded with Belladonna and Pyrethrum. From the former it is distinguished by its brownish-yellow colour, and by the close, transverse markings, which give it a ringed appearance. It differs from pyrethrum in its toughness, and in the absence of the black, shining points seen in the thick, brittle bark. Gentian is bitter, while pyrethrum causes a prickling sensation in the mouth.

**Extractum Gentianæ.**

A brownish-black soft extract, prepared by evaporating a decoction of the root.

Dose—2 to 10 grs. A harmless excipient for making powders into pill masses.

**Infusum Gentianæ Compositum.** 60 grs. to ½ pint (1 hour.)

Prepared by infusing for 1 hour in 10 oz. boiling distilled water, 60 grs. each, gentian root and bitter-orange peel and ¼ oz. fresh lemon peel.

Dose—1 to 2 oz.

**Mistura Gentianæ.** ¼ oz. to 1 pint.

A sherry-coloured liquid, prepared by macerating for two hours ¼ oz. gentian, 30 grs. bitter orange-peel, and 30 grs. coriander in 2 oz. proof spirit, adding 8 oz. cold distilled water, and macerating for two hours more. Sometimes called "Scotch Infusion."

Dose—½ to 1 oz.

**Tinctura Gentianæ Composita.** 1½ oz. to 1 pint.

A golden brown liquid, prepared by percolating with 1 pint proof spirit 1½ oz. gentian, ¾ oz. bitter-orange peel, and ¼ oz. cardamom seeds.

Dose—½ to 2 drs.

**GLYCERINUM** (Glycerine). $C_3H_8O_3$.

A colourless, oily-looking, thick fluid, obtained from fats and fixed oils at a high temperature.

Demulcent and Nutrient, but seldom used internally, except to sweeten mixtures or make up pill masses. Externally—Emollient.

Dose—1 to 2 drs.

In addition to entering into the 5 glycerines, it is used in making Lin Pot. Iod. cum Sapone.

**Glycerinum Acidi Carbolici, &c.** (See under Acidum Carbol., &c.)

**GLYCYRRHIZÆ RADIX** (Liquorice Root)—Leguminosæ.

The pale-yellow, tough, fibrous root or underground stem in long, cylindrical branched pieces, *fresh* and *dried*, of Glycyrrhiza glabra; cultivated in England.

Demulcent; but chiefly used for its sweetening properties.

☞ This root is distinguished from others by its *yellow* and *fibrous* interior, and by its very sweet taste.

**Extractum Glycyrrhizæ**

A firm, black extract, prepared by maceration of the root in cold distilled water, and subsequent evaporation.

Chiefly used for making powders into pills.

IN—Confect. Sennæ, Dec. Aloes Co., Mist. Sennæ Co., Tinct. Aloes, and Troch. Opii.

**Extractum Glycyrrhizæ Liquidum.** 1 in 2 of Extract.

A dark liquid, prepared by evaporating a cold infusion of the root till the specific gravity of 1·16 is reached, and then adding $\frac{1}{8}$ its volume of rectified spirit.

Dose—1 dram.

**Pulvis Glycyrrhizæ Compositus.** 1 in 5.

A greenish powder, prepared by mixing senna and liquorice in fine powder 2 oz. each and sugar 6 oz.

Dose—30 to 60 grs.

In addition to the above, liquorice root enters into Confect. Terebinth., Dec. Sarsæ Co., Infus. Lini, Pil. Hydrarg., and Pil. Ferri Iod.

**GOSSYPIUM** (Cotton Wool)—Malvaceæ.

Being the hairs of the seed of several species of Gossypium, from America and India.

Used for its mechanical qualities in padding splints and covering burned surfaces, but introduced into the Pharmacopœia for making Pyroxylin.

**GRANATI RADICIS CORTEX** (Pomegranate Root Bark) —Myrtaceæ.

The greyish-yellow quills or fragments of the dried bark of the root of Punica Granatum. From the South of Europe.

Anthelmintic; used to destroy the tapeworm.

**Decoctum Granati Radicis.** 2 oz. to 1 pint.

Prepared by taking 2 oz. of the bark of the root of the pomegranate and 2 pints of water, and boiling down to 1 pint.

Dose—1 to 2 oz. every four hours. It causes purging.

**GUAIACI LIGNUM** (Guaiacum Wood—Lignum Vitæ)—Zygophyllaceæ.

The raspings or small chips, of a yellow or dark greenish colour, of Guaiacum officinale, from Jamaica.

Diaphoretic and Alterative; seldom used, except in preparations of the resin.

IN—Decoct. Sarsæ Co.

**GUAIACI RESINA** (Guaiacum Resin).

The resin from the stem of Guaiacum officinale, in large greenish-brown masses, obtained by exudation, or by heat.

Diaphoretic and Antisyphilitic.

Dose—10 to 30 grs., in milk or sherry.

**Mistura Guaiaci.** 11 grs. in 1 oz.

An emulsion, prepared by rubbing ½ oz. guaiacum resin, ½ oz. sugar, ¼ oz. gum acacia together, and gradually adding 1 pint cinnamon water.

Dose—½ to 2 oz.

**Tinctura Guaiaci Ammoniata.** 4 oz. to 1 pint.

A dark-brown liquid, prepared by macerating 4 oz. of guaiacum resin in 1 pint aromatic spirit of ammonia for 7 days.

A Stimulant and Diaphoretic.

Dose—½ to 1 dram, freely diluted.

In addition to the above, the resin enters into Pil. Hydrarg, Subchlor. Co.

**GUTTA-PERCHA**—(Sapotaceæ).

The concrete juice, in tough, light-brown, flexible pieces of Isonandra gutta. From Singapore.

Introduced to make the Liquor which is the basis of Charta Sinapis.

**Liquor Gutta-Percha.** 1 in 8.

A nearly colourless thick fluid, prepared by dissolving 1 oz. gutta-percha in 6 oz. chloroform, and adding 1 oz. carbonate of lead mixed with 2 oz. more chloroform, and decanting.

A good substitute for flexible collodion.

**HÆMATOXYLI LIGNUM** (Logwood)—Leguminosæ.

The dark-red or irridescent chips or raspings of the heartwood of Hæmatoxylum campechianum. From Jamaica and Honduras.

A pure Astringent.

Dose—10 to 30 grains in powder.

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**Decoctum Hæmatoxyli.** 1 oz. to 1 pint.

Prepared by boiling 1 oz. logwood in 1 pint distilled water for ten minutes, adding 60 grs. cinnamon near the end of the process, and making the strained product to measure 1 pint.

Dose—1 to 2 oz.

**Extractum Hæmatoxyli.**

A brittle, deep-red *solid*, prepared by boiling down an infusion of logwood to dryness.

Dose—10 to 30 grs., dissolved in water.

**HEMIDESMI RADIX** (Hemidesmus)—Asclepiadaceæ. (Indian Sarsaparilla).

The brownish, cylindrical, tortuous, dried root of Hemidesmus Indicus, marked with annular cracks. From India.

Supposed to possess the properties of sarsaparilla, but only used for flavouring.

**Syrupus Hemidesmi.** 1 in 8.

A deep-brown syrup, prepared by dissolving 28 oz. sugar in an infusion of 4 oz. hemidesmus root in 1 pint boiling water.

Dose—1 dr.; generally used as a pleasant addition to cough mixtures.

**HIRUDO** (the Leech).—Class Annelida.

Two leeches are official—the Hamburgh or green leech (Sanguisuga officinalis) and the speckled or English leech (S. medicinalis), the former having a dark-olive and the latter a greenish-yellow spotted belly. *Both* species have six rusty longititudinal stripes on the back, which distinguish them from the horse-leech and others. From South of Europe.

**HORDEUM DECORTICATUM** (Pearl Barley)—Graminaceæ.

The white, rounded, husked seeds of Hordeum Distichon. Cultivated in Britain.

Demulcent and Nutrient.

**Decoctum Hordei** (Barley Water).

Prepared by boiling 2 oz. washed pearl barley for twenty minutes in 1½ pint water.

Dose—Ad libitum.

**HYDRARGYRUM** (Mercury). Hg.

A brilliantly-lustrous fluid metal, 13½ times heavier than water.

Formerly used in the metallic state as a mechanical purgative in large doses. Its various preparations act very differently, but all produce the constitutional debilitating condition known as "Mercurialism," when taken for any length of time.

**Hydrargyrum cum Creta.** 1 in 3.

A greyish-blue powder, commonly called "grey powder," prepared by rubbing 1 oz. mercury with 2 oz. prepared chalk.

Alterative and Laxative.

Dose—3 to 8 grs., in powder or pill. For a child 1 year old, ¾ to 1½ gr.

**Emplastrum Hydrargyri.** 1 in 3.

A bluish solid, prepared by rubbing 3 oz. of mercury with 1 dram olive oil and 8 grs. of sulphur, and adding 6 oz. melted lead plaster (the sulphur aiding the division of the mercury).

Resolvent. This preparation sometimes affects the system through the absorption of the metal.

**Emplastrum Ammoniaci cum Hydrargyro.** 1 in 5 of Hg.

A dirty-blue coloured solid, prepared, like the above, from 3 oz. mercury, 12 oz. ammoniacum, 1 dram olive oil, and 8 grs. sulphur.

Discutient and Stimulant. Only affects the system in those very susceptible to the action of mercury.

**Linimentum Hydrargyri.** 1 in 3.

A thick, lead-coloured liquid, composed of mercurial ointment, solution of ammonia, and camphor liniment, of each 1 oz.

A Stimulant to chronic enlargements.

**Pilula Hydrargyri.** 1 in 3.

"Blue pill," prepared by rubbing 2 oz. mercury and 3 oz. confection of roses, and adding 1 oz. liquorice in fine powder.

Dose—3 to 8 grs.

**Suppositoria Hydrargyri.** 5 grs. ointment in each.

Prepared by melting together ointment of mercury 60 grs., benzoated lard and white wax, of each 20 grs., and oil of theobroma 80 grs., and pouring into 12 conical moulds.

**Unguentum Hydrargyri.** 1 in 2.

A blue ointment, prepared by rubbing together 1 lb. of mercury, 1 lb. of lard, and 1 oz. suet.

Used, to rapidly introduce the metal into the system through the skin.

☞ **There are 7 ointments bearing the name of mercury. (See page 83.)**

**Unguentum Hydrargyri Compositum.** 1 of the metallic mercury in 4½.

A bluish ointment, consisting of ointment of mercury 6 oz., yellow wax and olive oil, of each 3 oz., camphor 1½ oz. Contains 1 part mercurial ointment in 2¼ parts.

**This is a substitute for Scott's ointment.**

**Hydrargyri Iodidum Rubrum.** $HgI_2$.

A crystalline vermillion powder, prepared by mixing hot solutions of perchloride of mercury and iodide of potassium, and drying the precipitate.

A powerful Irritant and Vesicant. Seldom given internally in this form.

Dose—1/16 to ¼ gr., in pill; sometimes given by prescribing the perchloride with Iodide of Potassium in *solution.*

**Unguentum Hydrargyri Iodidi Rubri.** 16 grs, to 1 oz.

A brilliant red ointment, prepared by mixing 16 grs. of red iodide of mercury with 1 oz. simple ointment.

Absorbent and Discutient to glandular growths.

**Hydrargyri Iodidum Viride.** $HgI$.

A dull green powder, prepared by rubbing 1 oz. mercury with 278 grs. iodine, and moistening occasionally with rectified spirit.

Alterative, but owing to its unstable qualities it is seldom given.

Dose—1 to 3 grs., in pill. Should be always made fresh. The addition of iodine or iodide of potassium converts it into the dangerous Biniodide.

**Liquor Hydrargyri Nitratis Acidus.** 48 per cent.

A colourless solution of 4 oz. mercury in 5 oz. nitric acid and 1½ oz. distilled water.

Caustic; not used internally.

**Unguentum Hydrargyri Nitratis.** 1 in 16 nearly.

Called, from its colour, citrine ointment; prepared by adding a solution of 4 oz. mercury in 12 oz. nitric acid to a hot mixture of 15 oz. lard and 32 oz. olive oil.

A local Alterative, Astringent, and Stimulant.

**Hydrargyri Oxidum Flavum.** $HgO$.

A yellow powder, prepared by mixing solutions of perchloride of mercury and soda, washing and drying the precipitate.

Used in Ophthalmia of the eyelids (6 grs. to 1 oz. lard); not taken internally.

It has the same composition as the following, only in more minute division:—

**Hydrargyri Oxidum Rubrum.** $HgO$.

Known as "Red Precipitate." An orange-red powder, prepared by heating dry mercuric nitrate (obtained by evaporating a solution of mercury in nitric acid) with metallic mercury.

Dose—¼ to ¾ gr., in pill; seldom given internally.

**Unguentum Hydrargyri Oxidi Rubri.** 62 grs. to 1 oz. or 1 in 8.

A red ointment, composed of red oxide of mercury 62 grs., yellow wax ¼ oz., almond oil ¾ oz.

A local Stimulating Absorbent.

**Hydrargyri Perchloridum.** $HgCl_2$.

Perchloride or Bichloride of mercury or Corrosive sublimate. In heavy colourless masses of prismatic crystals, prepared by subliming a mixture of sulphate of mercury (mercuric sulphate), chloride of sodium, and black oxide of manganese.

Alterative. In even small quantity an irritant poison.

Dose—$\frac{1}{16}$ to ⅛ grain.

As this salt is decomposed by so many substances it is advisable to order it in plain solution or in Dec. Sarsæ Co., or in solution with iodide of potassium.

**Liquor Hydrargyri Perchloridi.** ½ gr, in 1 oz.

A colourless solution of 10 grs. corrosive sublimate and 10 grs. sal ammoniac in 1 pint distilled water.

Dose—½ to 2 drams, diluted. Each dram contains $\frac{1}{16}$ grain.

**Lotio Hydrargyri Flava.** 18 grs. to 10 oz.

"Yellow Wash," prepared by adding 18 grs. corrosive sublimate to 10 ozs. limewater (the yellow oxide—HgO—falls as a precipitate).

Resembles the yellow and red oxides in action.

**Hydrargyri Subchloridum.** Calomel. HgCl.

A dull-white heavy powder, prepared by subliming mercurous sulphate (obtained by rubbing mercuric sulphate and mercury together) with dried chloride of sodium, and washing the sublimate in boiling water.

Alterative, Purgative, and in large doses Sedative.

Dose—1 to 5 grs., in pill or powder. A child 1 year old may get as much as 1 gr. with safety.

**Lotio Hydrargri Nigra.** 3 grs. to 1 oz.

"Black Wash." Prepared by adding 30 grains calomel to 10 oz. lime water, the black precipitate formed being $Hg_2O$.

**Pilula Hydrargyri Subchloridi Composita.** 1 in 5.

An orange mass, prepared by beating together 1 oz. calomel, 1 oz. sulphurated antimony, 2 oz. guaiacum resin, and 1 oz. castor oil. Commonly known as Plummer's pill or Compound Calomel pill.

Dose—5 to 10 grs, as an Alterative and feeble cathartic.

**Unguentum Hydrargyri Subchloridi.** 80 grs. to 1 oz.

A yellowish-white ointment, prepared by mixing 80 grs. calomel and 1 oz. lard.

Alterative and Resolvent, but seldom used.

**Hydrargyri Sulphas.** $HgSO_4$.

A white, heavy, crystalline powder, prepared by heating 20 oz., by weight, of mercury with 12 oz. sulphuric acid. Used for making calomel and corrosive sublimate.

**Hydrargyrum Ammoniatum.** $NH_2HgCl$.

Ammoniated mercury or white precipitate; a white powder, prepared by mixing solutions of perchloride of mercury and ammonia, and washing the precipitate.

Used as an insecticide, and never taken internally.

**Unguentum Hydrargyri Ammoniati.** 62 grs. to 1 oz.

A white ointment, prepared by mixing 62 grs. ammoniated mercury and 1 oz. simple ointment.

A Stimulant in chronic skin diseases, and to destroy pediculi.

**HYOSCYAMI FOLIA** (Hyoscyamus Leaves)—Solanaceæ.

The sinuated, hairy, dried leaves of Hyoscyamus niger (Henbane); also, the *fresh* clammy leaves, with their branches—gathered from *biennial* British plants when two-thirds of the flowers are expanded.

Narcotic, Anodyne, and Sedative.

**Extractum Hyoscyami.**

A dark soft mass, prepared by the cautious evaporation of the juice of the fresh leaves and branches of hyoscyamus.

Dose—5 to 10 grains, in pill.

**Pil. Colocynthidis Co. et Hyoscyami.** (See Colocynth).

**Succus Hyoscyami.**

The juice of the fresh leaves and branches, to which ⅓ of its volume rectified spirit is added.

Dose—½ to 1 dram.

**Tinctura Hyoscyami.** 2½ oz. to 1 pint.

A greenish-brown liquid, prepared by percolating 2½ oz. hyoscyamus leaves with 1 pint proof spirit.

Dose—½ to 1 dram.

**IODUM** (Iodine). I.

A non-metallic element, in dark, lustrous, laminar crystals, obtained from the ashes of sea-weeds.

A Lymphatic Stimulant, Absorbent, and Alterative.

Dose—½ gr., but should not be given in this form, because of its irritative action on the stomach.

Starch and free ammonia should not be ordered with preparations of iodine.

**Linimentum Iodi.** 1 dr. to 1 oz. 5 times the strength of the Tincture.

A dark, reddish-brown liquid, prepared by dissolving iodine 2½ oz., iodide of potassium 1 oz., camphor ½ oz., in rectified spirit, 1 pint.

Absorbent and Counter-irritant.

**Liquor Iodi.** 20 grs. to 1 oz.

A brownish-red liquid, prepared by dissolving iodine 20 grs., iodide of potassium 30 grs., in distilled water 1 oz.

Acts like the liniment, only weaker.

**Tinctura Iodi.** 11 grs. to 1 oz.

A deep red liquid, prepared by dissolving—iodine ½ oz., iodide of potassium ¼ oz., in rectified spirit 1 pint.

Dose—5 to 20 minims, freely diluted; used in making Vapor Iodi.

**Unguentum Iodi.** 16 grs. to 1 oz.

A dark orange-brown ointment, prepared by rubbing iodine 16 grs. and iodide of potassium 16 grs. with proof spirit ½ dr., and adding lard 1 oz.

Resolvent, Alterative, and Irritant.

**Vapor Iodi.** 1 dr. tincture to 1 oz. distilled water.

Mixed in a suitable apparatus, and heat applied, so that the vapour may be inhaled.

Laryngeal Sedative.

Iodides of Cadmium, Iron, Mercury, Potassium, and Sulphur, and their preparations are given under the name of each metal.

**IPECACUANHA** (or Hippo)—Cinchonaceæ or Rubiaceæ.

The dried root of Cephaelis Ipecacuanha. Imported from Brazil in small, annular, contorted, brown, worm-like pieces. Powder, pale fawn colour.

Dose—½ to 2 grs. act as an Expectorant, 10 grs. as an Hepatic Stimulant, and 15 to 30 as an Emetic.

For a child 1 year old, as an Expectorant, $\frac{1}{12}$ to ¼ gr.; as an Emetic, 2 to 4 grs.

In addition to the following, Hippo enters into Pil. Conii Co.

**Pilula Ipecacuanhæ cum Scilla.** 1 in 23½.

Composed of compound powder of ipecacuanha 3 oz., squill and ammoniacum of each 1 oz., treacle q.s., beaten into a mass.

Expectorant, Diaphoretic, and Diuretic.

Dose—5 to 10 grs.

**Pulvis Ipecacuanhæ Compositus.** 1 in 10.

A fawn-coloured powder, composed of opium ½ oz., ipecacuanha ½ oz., and sulphate of potash 4 oz. It is commonly known as Dover's Powder.

Diaphoretic, Anodyne, Narcotic.

Dose—5 to 15 grs.

**Trochisci Ipecacuanhæ.** ¼ grain in each.

A fawn-coloured lozenge, composed of ipecacuanha 180 grs., sugar 25 oz., gum acacia 1 oz., mucilage 2 oz., water q.s., in 720 lozenges.

Dose—1 to 3 lozenges as an Expectorant.

**Trochisci Morphiæ et Ipecacuanhæ.** $\frac{1}{36}$ and $\frac{1}{12}$ gr. in each.

Lozenges of a dirty-white colour, composed of hydrochlorate of morphia 20 grs, ipecacuanha 60 grs., tincture of tolu ½ oz., sugar 24 oz., water ½ oz., gum acacia 1 oz., mucilage q.s., in 720 lozenges.

Action similar to Dover's Powder.

Dose—1 to 6 lozenges.

**Vinum Ipecacuanhæ.** 1 oz. to 1 pint (22 grs. in 1 oz.)

A slightly muddy, brownish liquid, prepared by macerating ipecacuanha root 1 oz. in sherry 1 pint for 7 days.

Dose—As an Expectorant, 5 to 40 minims; as an Emetic, 3 to 6 drs.

For a child 1 year old, as an Expectorant, 2 to 5 minims; as an Emetic, ¼ to 1 dr.

**JALAPA** (Jalap). Convolvulaceæ.

The dried tuberous root, in brown, wrinkled, dense, ovoid pieces, from a pigeon's to a turkey's egg in size, of Exogonium Purga, from Mexico.

A brisk Hydragogue Cathartic.

Dose—10 to 30 grs., in powder, milk, or porter.

1 to 2 grs. for a child one year old.

**Extractum Jalapæ.** 1 from 2.

A dark-brown extract, obtained by evaporating a strong tincture of jalap root, and also by evaporating a cold infusion made from the marc of the tincture, mixing the two extracts thus obtained, and continuing the evaporation.

Dose—5 to 15 grs., in pill.

**Pulvis Jalapæ Compositus.** 1 in 3.

A powder, closely resembling Dover's in appearance, composed of jalap 5 oz., cream of tartar 9 oz., and ginger 1 oz.

A Hydragogue Cathartic.

Dose—20 to 60 grs.

**Resina Jalapæ.**

A dark-brown shining solid, in opaque, brittle fragments, prepared by exhausting jalap with spirit, and precipitating the resin from the resulting tincture by adding water, washing it with warm water, and drying on a water-bath. Resembles jalap in its action, only much more powerful.

Dose—2 to 5 grs., in pill or powder.

**Tinctura Jalapæ.** 2½ oz. to 1 pint.

A deep-brown liquid, prepared by percolating 2½ oz. jalap with 1 pint proof spirit.

Dose—½ to 2 drs.

In addition to the above, Jalap enters into Pulv. Scammonii Co.

**JUNIPERI OLEUM** (Oil of Juniper)—From Coniferæ.

The colourless or pale yellow oil distilled in Britain from the unripe fruit of Juniperus communis.

A Stimulating Diuretic and Carminative.

Dose—1 to 3 minims, on sugar or in pill.

**Spiritus Juniperi.** 1 in 50.

A colourless solution of oil of juniper 1 oz. in rectified spirit 49 oz.

Dose—½ to 1 dram.

IN—Mistura Creasoti.

**KAMALA** (Kamala)—From Euphorbiaceæ.

A granular, red, sand-like powder, consisting of the minute glands that cover the capsules of Rottlera tinctoria, from India.

Cathartic and Anthelmintic. Used to kill *tænia solium*.

Dose—½ to 2 drs., swallowed in milk or gruel.

**KINO** (Kino)—From Leguminosæ.

The inspissated juice, in small, angular, glistening, dark-red fragments, obtained from incisions in the trunk of Pterocarpus Marsupium, from Malabar.

A powerful Astringent (contains 70 to 80 per cent. of tannin).

Dose—10 to 30 grs.

The preparations of Kino, since they contain so much tannin, should not be ordered with iron.

In addition to the following, Kino enters into Pulv. Catechu Co.

**Pulvis Kino Compositus.** 3 in 4.

A dark-red powder, composed of kino 3¾ oz., opium ¼ oz., cinnamon 1 oz.

Astringent, Anodyne, and Narcotic.

Dose—5 to 20 grs.

**Tinctura Kino.** 2 oz. to 1 pint.

A deep reddish-brown liquid, prepared by macerating kino 2 oz. in rectified spirit 1 pint.

Dose—½ to 2 drams, in sherry.

**Kousso**—(See Cusso)—Rosaceæ.

**KRAMERIÆ RADIX** (Rhatany Root)—Polygalaceæ.

The dried, rough, brownish-red, branched root of Krameria triandra—Rhatany—in long pieces, about 1 inch in diameter, from Peru.

Astringent and Tonic.

Dose—10 to 30 grs., in powder. Containing large quantities of tannin, it should not be ordered with iron.

In addition to the following, Rhatany enters into Pulv. Catechu Co.

**Extractum Krameriæ.**

A deep reddish-brown, *solid* extract, obtained by evaporating a cold infusion of rhatany root on a water-bath.

Dose—5 to 20 grs., in pill, or rubbed up with chalk mixture.

**Infusum Krameriæ.** ½ oz. to 10 oz. (1 hour).

Prepared by infusing rhatany root ½ oz. in boiling water 10 oz.

Dose—1 to 2 oz.

**Tinctura Krameriæ.** 2½ oz. to 1 pint.

A deep red liquid, prepared by percolating rhatany root 2½ oz. with proof spirit 1 pint.

Dose—½ to 2 drs.

**LAC** (the fresh milk of the cow, Bos Taurus).

Used in making Mistura Scammonii.

**LACTUCA** (Lettuce)—Compositæ.

The flowering herb of Lactuca virosa—the strong-scented lettuce.

**Extractum Lactucæ.**
The evaporated juice of the fresh herb (one of the so-called green extracts). It is brownish-black in colour.
Diuretic, Sedative, and Narcotic.
Dose—5 to 15 grs., in pill.

**LARICIS CORTEX** (Larch Bark)—Coniferæ.
The inner bark, in red quills or flat pieces, of Larix Europæa (common larch).
A Stimulating Astringent, used to check profuse expectoration.

**Tinctura Laricis.** 2½ oz. to 1 pint.
A dark-red liquid, prepared by percolating larch bark 2½ oz. with rectified spirit 1 pint.
Dose—20 to 30 minims.

**LAUROCERASI FOLIA** (Cherry Laurel Leaves)—Rosaceæ.
The elliptical, smooth, shining, deep-green, fresh leaves of Prunus Laurocerasus—the common or cherry laurel.

**Aqua Laurocerasi.** 1 lb. to 1 pint.
A colourless liquid, prepared by distilling 1 pint from 1 lb. fresh cherry laurel leaves and 2½ pints of water.
Sedative; resembling prussic acid, to which it owes its virtues.
Dose—5 to 30 minims.

**LAVANDULÆ OLEUM** (Oil of Lavender)—From Labiatæ.
The almost colourless oil distilled in Britain from the flowers of Lavandula vera.
Stimulant, Carminative, and Antispasmodic.
Dose—1 to 4 minims, in pill or on sugar or in emulsion.
IN—Linim. Camph. Co.

**Spiritus Lavandulæ.** 1 in 50.
A colourless solution of oil of lavender 1 oz. in rectified spirit 49 oz.
Dose—½ to 1 dram.

**Tinctura Lavandulæ Composita.** 45 minims to 1 pint.
A bright crimson liquid, prepared by macerating cinnamon and nutmeg of each 75 grs. and red sandal wood 150 grs. in rectified spirit 1 pint for 7 days, filtering, and adding oil of lavender 45 min. and oil of rosemary 5 min.
Dose—½ to 2 drs.
IN—Liquor Arsenicalis as a colouring agent.

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**LIMONIS CORTEX** (Lemon Peel)—Aurantiaceæ.

The outer yellow part of the rind of the fresh fruit of Citrus Limonum, from Southern Europe.

Aromatic ; chiefly used for its flavour.

In addition to the following, it enters into Inf. Aurant. Co. and Inf. Gent. Co.

**Oleum Limonis.** Expressed or Distilled

From the fresh lemon peel in Sicily ; the oil is contained in little vesicles on the surface of the rind. It is of a straw colour.

Dose—1 to 4 minims, but chiefly used for flavouring.

IN—Lin. Pot. Iod. cum Sapone and Spt. Ammon. Aromat.

**Succus Limonis.** =32½ grs. citric acid in 1 oz.

The freshly expressed juice of the ripe fruit of Citrus Limonum. A slightly turbid, yellowish liquid, with a grateful odour.

Refrigerant and Antiscorbutic.

Dose—½ to 2 oz.

**Syrupus Limonis.** 1 of juice in 2.

A yellowish syrup, prepared by infusing fresh lemon peel 2 oz in boiling lemon juice 1 pint, filtering, and adding 2¼ lb. of sugar.

Dose—1 dram.

**Tinctura Limonis.** 2½ oz. to 1 pint.

A sherry-coloured liquid, prepared by macerating *fresh* lemon peel 2½ oz. in proof spirit 1 pint for 7 days.

Dose—½ to 2 drs.

**LINI FARINA** (Linseed Meal)—Linaceæ.

The powdered cake of linseed from which the oil has been pressed. It enters into all the poultices except yeast.

**Cataplasma Lini.**

Linseed meal 4 oz. gradually mixed with boiling water 10 oz. and olive oil ½ oz.

**Lini Semina.**—Linaceæ.

The small, shining, oval, brown, pointed seeds of Linum usitatissimum, common flax, grown in Britain.

Demulcent, Emollient, and Nutrient.

**Infusum Lini.** 160 grs. to 10 oz. (4 hours).

Prepared by infusing for *four* hours linseed 160 grs., fresh liquorice 60 grs., boiling water 10 oz.

Dose—2 to 5 oz.

**Oleum Lini.**

The thick yellow oil expressed without heat from linseed. Only used externally as an Emollient.

**LITHIÆ CARBONAS** (Carbonate of Lithia). $L_2CO_3$.

In a white powder, or in minute crystalline grains.
Diuretic and Antacid; acting like soda and potash.
Dose—3 to 6 grs., given in effervescing water.

**Liquor Lithiæ Effervescens.** 10 grs. to 1 pint.

Carbonate of lithia 10 grains is added to water 1 pint, charged at a pressure of seven atmospheres with washed carbonic acid gas.

Dose—5 to 10 oz.

**Lithiæ Citras.** $L_3C_6H_5O_7$.

A white, amorphous, deliquescent powder, prepared by adding carbonate of lithia to a solution of citric acid till effervescence ceases, and evaporating.

Acts like the carbonate.
Dose—5 to 10 grains in solution, freely diluted.

**LOBELIA** (Lobelia)—Lobeliaceæ.

The dried flowering herb of Lobelia inflata (Indian Tobacco). Imported from North America in compressed rectangular parcels of angular stems, alternate toothed hairy leaves and inflated fruits.

**Tinctura Lobeliæ.** 2½ oz. to 1 pint.

A greenish-brown liquid, prepared by percolating lobelia 2½ oz. with proof spirit 1 pint.

Diuretic, Expectorant, Emetic, and Antispasmodic.
Dose—10 to 30 minims.

**Tinctura Lobeliæ Ætherea.** 2½ oz. to 1 pint.

A green liquid, prepared by macerating lobelia 2½ oz. in spirit of ether 1 pint, for seven days.

Dose—10 to 30 minims.

**LUPULUS** (Hop)—Urticaceæ.

The dried greenish-yellow strobiles or membranous cones of the female plant of Humulus Lupulus, grown in England.

A Bitter Tonic and Narcotic.

**Extractum Lupuli.**

The dark-brown extract, prepared by evaporating a tincture of hop, making a decoction of the marc, which is likewise to be evaporated; the spirituous and aqueous extracts to be mixed, and the evaporation continued till a pilular consistence is reached.

Dose—5 to 15 grs., in pill.

**Infusum Lupuli.** ½ oz. to 10 oz. (2 hours).

Prepared by infusing hop ½ oz. in boiling water 10 oz.

Dose—1 to 2 oz.

**Tinctura Lupuli.** 2½ oz. to 1 pint.

A deep-red liquid, prepared by percolating hop 2½ oz. with proof spirit 1 pint.

Dose—½ to 2 drams.

**MAGNESIA** (Calcined or Heavy Magnesia). $MgO$.

A white insoluble powder, prepared by calcining heavy carbonate of magnesia in a loosely-covered crucible.

Antacid, Laxative, and Antilithic.

Dose—10 to 60 grs., in milk.

**Magnesia Levis** (Light Magnesia). $MgO$.

A bulky, white, insoluble powder, identical with the preceding, only being lighter, bulk for bulk, in the proportion of 3½ to 1. Prepared by calcining light carbonate of magnesia.

Dose—10 to 60 grs.

IN—Pulvis Rhei Compositus.

**Magnesiæ Carbonas.** $(MgCO_3)_3.MgO.5H_2O$.

This is known as heavy carbonate of magnesia. It is a white granular powder, prepared by mixing *strong*, hot solutions of sulphate of magnesia and carbonate of soda, washing and drying the precipitate by a heat not exceeding 212°.

Dose—10 to 40 grs. as an Antacid, 1 to 2 drs. as a Purgative.

For a child 1 year old 5 grs. act as a mild Purgative.

IN—Liq. Magnes. Carb. and Troch. Bismuthi.

**Magnesiæ Carbonas Levis.** $(MgCO_3)_3.MgO.5H_2O$.

Light carbonate of magnesia. A very light, partially amorphous powder, prepared by mixing *weak* cold solutions of sulphate of magnesia and carbonate of soda, washing the precipitate, and drying by a heat not exceeding 212°.

Dose—10 to 60 grs.

**Liquor Magnesiæ Carbonatis.** 13 grs. in 1 oz.

A colourless liquid, prepared by boiling together a solution of sulphate of magnesia 2 oz. in water 10 oz., and a solution of carbonate of soda 2½ oz. in water 10 oz., washing carefully the precipitated carbonate of magnesia, mixing it with distilled water 1 pint, and passing pure carbonic acid gas through it till dissolved. Known as "Fluid Magnesia."

Antacid and mildly Purgative.

Dose—1 to 2 oz.; ½ dr. for a child 1 year old.

**Liquor Magnesiæ Citratis.** About 15 grs. Mag. Cit. in 1 oz.

Dissolve citric acid 200 grs. in water 2 oz., add carbonate of magnesia 100 grs., filter the solution into a strong half-pint bottle, and add syrup of lemons ½ oz., fill up with water, and add bicarbonate of potash 40 grs., and cork quickly, tying down with wire.

Antacid and Cathartic.

Dose—5 to 10 oz.

**Magnesiæ Sulphas.** $MgSO_4$.

Commonly known as Epsom salt, in minute, colourless, rhombic prisms; 3 oz. dissolve in about 4 oz. water.

Purgative.

Dose—1 to 4 drs; should always be given freely diluted.

In addition to the Enema, it enters into Mist. Sennæ Co.

**Enema Magnesiæ Sulphatis.** 1 in 16.

Composed of sulphate of magnesia 1 oz., olive oil 1 oz., mucilage of starch 15 oz.—for one enema.

**MANGANESII OXIDUM NIGRUM** (Black Oxide of Manganese). $MnO_2$.

A heavy, black powder, used for producing chlorine.

**MANNA** (Manna)—Oleaceæ.

A concrete saccharine exudation from the stem of Fraxinus Ornus and F. rotundifolia, by making incisions in the trees in Calabria and Sicily,

In stalactiform, porous, uneven, dirty-white pieces.

Laxative; chiefly used for children.

Dose—1 dram to 1 oz.; 10 to 20 grs. for a child 1 year old.

**MARMOR ALBUM** (White Marble). $CaCO_3$.

Crystalline native carbonate of lime in hard, white masses.

Used for producing carbonic acid gas.

**MASTICHE** (Mastich)—Anacardiaceæ.

A resinous exudation, in small, irregular, brittle, yellow tears; obtained by incision from the stem of Pistacia Lentiscus, in Scio.

Chiefly used for its physical properties in pill masses.

**MATICÆ FOLIA** (Matico Leaves)—Piperaceæ.

The dried, long, pointed leaves, with a square network of intersecting veins on their upper surface, of Artanthe elongata, from Peru.

An Aromatic Stimulating Tonic and local Styptic.

Dose—½ to 2 drams, in powder.

**Infusum Maticæ.** ½ oz. to 10 oz. (½ hour).

Matico leaves ½ oz. in boiling water 10 oz.

Dose—1 to 4 oz.

**MEL** (Honey).

A viscid, translucent, brownish-yellow liquid, gradually becoming opaque and crystalline, being the saccharine secretion deposited in the honeycomb by Apis mellifica, the hive bee.

Demulcent and Laxative. Generally used for its sweetness.

Dose—1 dr. to 1 oz.

**Mel Depuratum** (Clarified Honey).

Honey strained whilst hot through wetted flannel.

Enters, in addition to the following, into Confections of Pepper, Scammony, and Turpentine.

**Mel Boracis.** 64 grs. to 1 oz., or 1 in 8.

Prepared by rubbing borax 64 grs. with clarified honey 1 oz. It is almost liquid, and resembles honey.

Alterative to diseased mucous surfaces.

**Oxymel.** 4 in 5.

A thick syrupy liquid, composed of clarified honey 40 oz., acetic acid 5 oz., water 5 oz., mixed with heat.

Expectorant, but chiefly used as a vehicle.

Dose—1 to 2 drs.

**Oxymel Scillæ** (Oxymel of Squills).

An opalescent brownish liquid, composed of vinegar of squill 1 pint, clarified honey 2 lbs., evaporated till the S.g. of 1·32 is reached.

Expectorant.

Dose—½ to 1 dr.

**MENTHÆ PIPERITÆ OLEUM** (Oil of Peppermint)—Labiatæ.

The colourless or pale yellow oil distilled in Britain from the fresh flowering herb of Mentha piperita.

Stimulant, Antispasmodic, and Carminative.

Dose—1 to 4 minims, on sugar, in pill, or in emulsion.

In addition to the following, it enters into Pil. Rhei Co.

**Aqua Menthæ Piperitæ.** 1½ dr. to 1 gallon, or 1 minim in 1½ oz.

A colourless liquid, prepared by mixing oil of peppermint 1½ drs. with water 1½ gallons, and distilling 1 gallon.

Dose—1 to 2 oz.; 1 dr. for a child 1 year old.

IN—Mistura Ferri Aromatica.

**Essentia Menthæ Piperitæ.** 1 in 5.

Oil of peppermint 1 oz. dissolved in rectified spirit 4 oz., making a faintly yellow liquid.

Dose—10 to 20 minims.

**Spiritus Menthæ Piperitæ.** 1 in 50.

A colourless solution of oil of peppermint 1 oz. in rectified spirit 49 oz.

Dose—½ to 1 dram; 2 to 4 minims for a child 1 year old.

**MENTHÆ VIRIDIS OLEUM** (Oil of Spearmint)—Labiatæ.

The colourless or pale yellow oil distilled in Britain from the fresh flowering Mentha viridis.

Action and dose similar to peppermint.

**Aqua Menthæ Viridis.** 1½ drs. to 1 gal., or 1 minim in 1½ oz.

A colourless liquid, obtained by mixing oil of spearmint 1½ drs. and water 1½ gallons, and distilling 1 gallon.

Dose—1 to 2 oz.; 1 dr. for a child 1 year old.

**MEZEREI CORTEX** (Mezereon Bark)—Thymelaceæ.

The dried bark, in tough brown strips or quilled pieces, of various lengths, of Daphne Mezereum or of Daphne Laureola.

Diuretic, Alterative, and externally Vesicant.

Dose—10 to 15 grs., in decoction. Seldom used.

Enters into Dec. Sarsæ. Co. 60 grs. to 1 pint.

**Extractum Mezerei Æthereum.**

A dark-green extract, prepared by evaporating a strong tincture of mezereon and macerating the residue with ether, which is poured off, filtered, and evaporated to the proper consistence.

Enters into Lin. Sinapis Co. 8 grs. to 1 oz.

**MICA PANIS** (Bread Crumb).

The soft crumb of bread. Enters into Cataplasma Carbonis.

**MORI SUCCUS** (Mulberry Juice)—Urticaceæ.

The purple juice of the ripe mulberry, Morus nigra.

Laxative and Refrigerant.

**Syrupus Mori.** 1 in 2.

A deep-red syrup, prepared by filtering boiled mulberry juice 1 pint, and dissolving in it sugar 2 lb., and adding rectified spirit 2½ oz.

Dose—1 dram.

**MORPHIÆ ACETAS** (Acetate of Morphia). 1 gr. is equivalent in narcotic power to about 6 grs. of Opium.

A white soluble powder, prepared by mixing a solution of hydrochlorate of morphia with solution of ammonia, and thus precipitating pure morphia, which, when washed, is dissolved in acetic acid and water, and the solution, on evaporation, yields acetate of morphia.

Anodyne and Narcotic.

Dose—⅛ to ½ gr., in solution.

**Liquor Morphiæ Acetatis.** 4 grs. in 1 oz.

An almost colourless liquid, prepared by dissolving acetate of morphia 4 grs. in distilled water 6 drs., to which rectified spirit 2 drs. and dilute acetic acid 8 minims have been added.

Dose—10 to 60 minims.

**Injectio Morphiæ Hypodermica.** 5 grs. in 1 dram.

A clear solution, prepared by adding solution of ammonia to hydrochlorate of morphia 88 grs., dissolved in water 2 oz., so that all the morphia is thrown down; the precipitate is then carefully dissolved in water, with enough acetic acid to make a slightly acid solution, which is to measure 2 ozs.

Dose—by subcutaneous injection—1 to 6 minims.

**Morphiæ Hydrochloras** (Hydrochlorate of Morphia).

A white powder, or in white, fine, silky prisms, obtained by a complicated process from opium, of which the following is an outline:—

Opium is thoroughly exhausted by water, and the solution concentrated. To this chloride of calcium is added, which produces meconate of calcium and hydrochlorate of morphia, and the liquid is evaporated till solidification occurs. Out of this solid cake the impure hydrochlorate is washed repeatedly with hot water, the solution digested with animal charcoal to destroy its colour, and precipitated by ammonia, which throws down pure morphia. This is washed and suspended in hot water, and hydrochloric acid added to form a neutral solution, out of which the salt crystallises on cooling.

Action, dose, and strength similar to the acetate of morphia.

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**Liquor Morphiæ Hydrochloratis.** 4 grs. in 1 oz.

A colourless liquid, prepared by dissolving hydrochlorate of morphia 4 grs. in distilled water 6 drs., to which rectified spirit 2 drs. and dilute hydrochloric acid 8 minims have been added.

Dose—10 to 60 minims.

**Suppositoria Morphiæ.** ½ gr. in each.

Composed of hydrochlorate of morphia 6 grs., benzoated lard 64 grs., white wax 20 grs., and oil of theobroma 90 grs.; melt, and divide into 12 parts, or pour into conical moulds of 15 grs. each.

One to be used at a time.

**Suppositoria Morphiæ cum Sapone.** ½ gr. and 8⅓ grs. in each.

Composed of hydrochlorate of morphia 6 grs., glycerine of starch 50 grs., curd soap 100 grs., powdered starch q.s., to make a suitable paste, which is to be divided into 12 cones.

One to be used at a time.

**Trochisci Morphiæ.** $\frac{1}{36}$ gr. in each.

White lozenges, composed of hydrochlorate of morphia 20 grs., tincture of tolu ½ oz., sugar 24 oz., powdered gum acacia 1 oz., water ½ oz., mucilage of acacia q.s., to be mixed and divided into 720 lozenges.

Dose—1 to 6 lozenges.

**Trochisci Morphiæ et Ipecacuanhæ.** $\frac{1}{36}$ and $\frac{1}{12}$ gr. in each.

Lozenges of a dirty-white colour, prepared by adding 60 grs. of powdered hippo to the quantities in the preceding before dividing into 720 parts.

Dose—1 to 6 lozenges.

**MORRHUÆ OLEUM** (Cod Liver Oil).

The pale yellow oil extracted from the fresh liver of the cod—Gadus Morrhua—by a heat not exceeding 180°.

A Nutritive Tonic.

Dose—1 to 8 drs., in emulsion, or in milk, coffee, porter, &c.

**MOSCHUS** (Musk).

In small, irregular, reddish-black grains, being the dried secretion from the preputial follicles of Moschus moschiferus, native of Central Asia. Imported from China and India.

Stimulant and Antispasmodic.

Dose—5 to 10 grs., in bolus or emulsion.

**MYRISTICA** (Nutmeg)—Myristicaceæ.

The oval, furrowed kernel of the seed of Myristica officinalis. Imported from Sumatra.

Aromatic, Carminative, and Narcotic.

Dose—5 to 10 grs., in powder, in milk.

In addition to the following, Nutmeg enters into the composition of Pulv Catechu Co., Pulv. Cretæ Arom., Spt. Armoraciæ Co., and Tinct. Lavand. Co.

**Oleum Myristicæ** (*Volatile* Oil of Nutmeg).

The colourless or pale yellow oil distilled in Britain from nutmegs.

Dose—2 to 5 minims, on sugar.

Enters into Pil. Aloes Socot., Spt. Ammon. Aromat., and Spt. Myristicæ.

**Oleum Myristicæ Expressum** (Expressed Oil of Nutmeg).

A concrete, yellow, soft solid, obtained by expression and heat from nutmegs.

Enters into the composition of Emplastra Califaciens, and Picis.

**Spiritus Myristicæ.** 1 in 50.

A colourless solution of volatile oil of nutmeg 1 oz. in rectified spirit 49 oz.

Dose—½ to 1 dram.

Enters into Mistura Ferri Composita.

**MYRRHA** (Myrrh)—Amyridaceæ.

A gum-resinous exudation, in irregular brownish-yellow or red tears or masses, from the stem of Balsamodendron Myrrha, from Arabia and Abyssinia.

A Stimulating Tonic and Expectorant.

Dose—10 to 30 grs., in powder.

Enters into Dec. Aloes Co., Mist. Ferri Co., Pil. Aloes et Myrrhæ, Pil. Assafœtidæ Co., and Pil. Rhei Co.

**Tinctura Myrrhæ.** 2½ oz. to 1 pint.

A pale-brown liquid, prepared by percolating myrrh 2½ oz. with rectified spirit 1 pint.

Dose—½ to 1 dram, in sherry.

**NECTANDRÆ CORTEX** (Bebeeru Bark)—Lauraceæ.

In large, flat, heavy, greyish-brown pieces, 1 to 2 feet long, 2 to 6 inches broad, and ¼ inch thick, from Nectandra Rodiæi—the Greenheart tree of British Guiana.

Antiperiodic and Tonic; somewhat resembling quinia, but only used in the preparation of Beberiæ Sulphas.

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**NUX VOMICA** (Nux Vomica)—Apocynaceæ.

The circular, button-shaped seeds, covered with short, satiny hairs, of Strychnos Nux vomica, from the East Indies.

Tonic, and Stimulant to the spinal cord.

Dose—½ to 3 grs., in powder.

It is the source of Strychnia.

**Extractum Nucis Vomicæ.**

A brown extract, prepared by evaporating a strong spirituous tincture of nux vomica.

Dose—½ to 1 grain. The Pharmacopœia dose of ½ to 2 grs. is too large.

**Tinctura Nucis Vomicæ.** 2 oz. to 1 pint.

A sherry-coloured liquid, prepared by steaming, rapidly drying, and afterwards grinding nux vomica 2 oz. to powder, then percolating it with rectified spirit 1 pint.

Dose—10 to 20 minims.

**Oleum.** (For the different Oils see each under the name of the substance from which it is derived.)

**OLIVÆ OLEUM** (Olive Oil)—Oleaceæ.

The pale yellow oil expressed in Southern Europe from the ripe fruit of Olea Europæa—the olive.

Demulcent and Laxative.

Dose—2 drs. to 1 oz.

Enters into Charta Epispastica, Cataplasma Lini. Enema Mag. Sulph., 5 plasters, 4 ointments, and 3 liniments.

**OPIUM** (Opium)—Papaveraceæ.

The juice inspissated by spontaneous evaporation obtained by incision from the unripe capsules of the poppy—Papaver somniferum, grown in Asia Minor—in irregular lumps of from ¼ to 2 lbs., enveloped in fragments of poppy leaves, and, when fresh, tearing with an irregular, moist, brown surface; 100 grs. should yield at least from 6 to 8 grs. of morphia.

Anodyne and Narcotic.

Dose—½ to 2 grs.

**Pulvis Opii.** Opium in powder (of a rich brown colour).

☞ Although it is not recognised under a separate heading, it is inserted here to remind the student that opium cannot be powdered until it is first thoroughly dried, and that in drying it loses water, and in grinding there is a further loss of inert woody fibrous impurities, and the powder is stronger than the fresh opium by about ⅛, 7 grs. being equal to 8 of opium.

**Confectio Opii.** 1 in 40.

A soft brown mass, composed of compound powder of opium 192 grs. rubbed up with syrup 1 fluid oz.

In addition to its Anodyne qualities it is an Antispasmodic and Carminative.

Dose—5 to 20 grs.

**Emplastrum Opii.** 1 in 10.

A hard brown solid, prepared by heating resin plaster 9 oz., and adding, by degrees, powdered opium 1 oz.

**Enema Opii.** ½ dr. tinct. to 2 oz.

A thick opaque liquid, prepared by mixing tincture of opium ½ dr. with mucilage of starch 2 oz. For one enema.

**Extractum Opii.** 1 from 2 of opium.

A dark-brown tough extract, prepared by evaporating a cold infusion of opium.

Dose—¼ to 2 grs. It is ¼ to ½ stronger than opium, and is said to be less stimulating.

In Trochisci Opii one-tenth gr. in each, in Vinum Opii 1 oz. to 1 pint, and in the following:—

**Extractum Opii Liquidum.** 22 grs. Extract in 1 oz.

A dark-brown liquid, consisting of extract of opium 1 oz., dissolved in distilled water 16 oz., to which is added rectified spirit 4 oz.

Dose—10 to 40 minims. It is about one-seventh stronger than laudanum. 22 min.=25 min. laudanum.

**Linimentum Opii.** 1 in 2.

An almost black liquid, consisting of equal parts laudanum and soap liniment.

**Pilula Ipecacuanhæ cum Scilla.** 1 in 23.

A brown mass, composed of Dover's powder 3 oz., squill 1 oz., ammoniacum 1 oz., treacle q.s., beaten together.

In addition to its Narcotic action, it is decidedly Expectorant.

Dose—5 to 10 grs.

**Pilula Plumbi cum Opio.** 1 in 8.

A brownish-black mass, composed of acetate of lead 36 grs., opium in powder 6 grs., and confection of roses 6 grs., beaten together.

Astringent as well as Narcotic. (Should be made fresh.)

Dose—3 to 5 grs.

**Pilula Saponis Composita.** 1 in 6.

A light-brown mass, composed of opium in powder ½ oz., hard soap 2 oz., water q.s., beaten together.

Dose—3 to 5 grs.

**Pulvis Cretæ Aromaticus cum Opio.** 1 in 40.

A pale brown powder, composed of opium ¼ oz , aromatic chalk powder 9¾ oz.

Carminative and Anodyne; well adapted for children.

Dose—10 to 40 grs.; for a child one year old, ½ to 1 gr.

**Pulvis Ipecacuanhæ Compositus.** 1 in 10.

Known as Dover's powder. A fawn-coloured powder, composed of ipecacuanha and opium of each ½ oz., sulphate of potash 4 oz.

Diaphoretic, Anodyne, and Expectorant.

Dose—5 to 15 grs., in pill, or as a powder.

IN—Pilula Ipecacuanhæ cum Scilla.

**Pulvis Kino Compositus.** 1 in 20.

A dark red powder, composed of kino 3¾ oz., opium ¼ oz., cinnamon 1 oz.

Astringent and Narcotic.

Dose—5 to 20 grs.

**Pulvis Opii Compositus.** 1 in 10.

A brown powder, composed of opium 1½ oz., black pepper 2 oz., ginger 5 oz., caraway 6 oz., tragacanth ½ oz.

Carminative and Narcotic.

Dose—2 to 5 grs.

IN—Confectio Opii. 1 in 4, or 1 of opium in 40.

**Suppositoria Plumbi Composita.** 1 gr. in each.

Composed of acetate of lead 36 grs., opium 12 grs., benzoated lard 42 grs., white wax 10 grs., oil of theobroma 80 grs.

1 gr. powdered opium, and 3 of acetate of lead in each.

**Tinctura Camphoræ Composita.** 2 grs. in 1 oz.

A sherry-coloured liquid, composed of opium 40 grs., benzoic acid 40 grs., camphor 30 grs., oil of anise 30 minims, proof spirit 1 pint, macerated for 7 days, and filtered. Known as Paregoric.

Anodyne, Expectorant, and Stimulant.

Dose—¼ to 1 dram. For a child 1 year old, 4 minims. This is the only safe liquid preparation of opium for very young children.

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**Tinctura Opii.** 1½ oz. to 1 pint, or 1 gr. in 14½ minims.

A dark reddish-brown liquid, prepared by macerating for 7 days, opium 1½ oz. in proof spirit 1 pint. Commonly known as Laudanum. Contains the soluble matter of 33 grs. in 1 oz.
Dose—5 to 40 minims.
Narcotic and Anodyne.

IN—Enema Opii and Linimentum Opii.

**Tinctura Opii Ammoniata.** 100 grs. to 1 pint. 1 gr. in 96 minims.

A dark reddish-brown liquid, prepared by macerating for 7 days opium 100 grs., saffron and benzoic acid of each 180 grs., oil of anise 1 dram, in strong solution of ammonia 4 oz. and rectified spirit 16 oz. Known as Scotch Paregoric.
A stimulating Anodyne and Expectorant.
Dose—½ to 1 dram, freely diluted.

**Trochisci Opii.** 1/10 gr. extract in each.

Brown lozenges, composed of extract of opium 72 grs., tincture of tolu ½ oz., sugar 16 oz., gum Acaia 2 oz., extract of liquorice 6 oz., distilled water q.s., divided into 720 lozenges.
Narcotic and Anodyne.
Dose—1 to 6 lozenges.

**Unguentum Gallæ cum Opio.** 32 grs. to 1 oz., or 1 in 14½.

A brown ointment, prepared by rubbing up powdered opium 32 grs. with ointment of galls 1 oz.
A soothing Anodyne to painful hæmorrhoids.

**Vinum Opii.** 22 grains of extract in 1 oz.

A brown liquid, prepared by macerating for 7 days, extract of opium 1 oz., cinnamon and cloves of each 75 grs., in sherry 1 pint—same strength as the fluid extract.
Anodyne. Sometimes used locally in ophthalmia.
Dose—10 to 40 minims.

☞ The brown *colour* and heavy peculiar *smell* of the preparations containing crude opium distinguish the majority of them from most harmless or inert preparations. The student should remember that this remark does not apply to the more powerful preparations containing the acetate and hydrochlorate of morphia.

The following tables give at a glance the strengths of the different Opium preparations, with the dose :—

Preparations containing Opium, but under another name:—

| NAME. | MADE WITH | STRENGTH. | DOSE. |
|---|---|---|---|
| **Pilula Ipecac. cum Scilla** .. .. | Dover's Powder .. | 1 in 23½. | 5 to 10 gr. |
| **Pilula Plumbi cum Opio** .. .. | Opium Powdered .. | 1 in 8. | 3 to 5 gr. |
| **Pilula Saponis Co.** | Do. Do. | 1 in 6. | 3 to 5 gr. |
| **Pulvis Cretæ Aromat. cum Opio** .. | Do. Do. | 1 in 40. | 10 to 40 gr. |
| **Pulvis Ipecac. Co.** | Do. Do. | 1 in 10. | 5 to 15 gr. |
| **Pulv. Kino Co.** .. | Do. Do. | 1 in 20. | 5 to 20 gr. |
| **Suppositoria Plumbi Composita** .. .. .. | Do. Do. | 1 gr. in each. | 1 for a dose. |
| **Tinct. Camphoræ Co.** .. .. .. | Opium in *coarse* Powder | 2 gr. to 1 oz. | ½ to 1 dr. |
| **Ungt. Gallæ cum Opio** .. .. | Opium Powdered .. | 32 gr. to 1 oz. | .. |

## MORPHIA.

| | | | |
|---|---|---|---|
| **Morphiæ Acetas** .. | 1 grain will produce as much effect as .. | 6 gr. opium. | ⅛ to ½ gr. |
| **Liq. Morphiæ Acet.** | Acetate .. .. .. | 4 gr. to 1 oz. | 10 to 60 min. |
| **Injectio Morphiæ Hypoderm.** .. | Hydrochlorate .. .. | 5 gr. to 1 dr. | 1 to 6 min. |
| **Morph. Hydrochl.** | 1 grain will produce as much effect as .. | 6 gr. opium. | ⅛ to ½ gr. |
| **Liq. Morp. Hydrochloratis** .. .. | Hydrochlorate .. .. | 4 gr. to 1 oz. | 10 to 60 min. |
| **Suppositoria Morphiæ** .. .. | Hydrochlorate .. .. | ½ gr. in each. | 1 for a dose. |
| **Do. cum Sapone** | Hydrochlorate .. .. | ½ gr. in each. | Do. |
| **Trochisci Morph.** | Hydrochlorate .. .. | 1-36 gr. in each. | 1 to 6. |
| **Do. et Ipecac.** | Hydrochlorate .. .. | 1-36 gr. in each. | 1 to 6. |

PREPARATIONS BEARING THE NAME OF "OPII."

| PREPARATION. | MADE WITH | STRENGTH. | DOSE. |
|---|---|---|---|
| **Confectio** .. | The Compound Powder of Opium .. .. .. | 1 in 40 | 5 to 20 grs |
| **Emplastrum** .. | Opium in fine powder .. | 1 in 10 | .. |
| **Enema** .. .. | Tincture of Opium .. | ½ dr. to 2 oz. | 2 oz. |
| **Extractum** .. | Opium in thin slices .. | ½ stronger than opium | ½ gr. to 2 grs. |
| **Extractum Liquidum** .. | Extract of Opium .. .. | 22 gr. to 1 oz. | 10 to 40 m. |
| **Linimentum** .. | Tincture of Opium .. | 1 in 2 | .. |
| **Pulvis Compositus** .. .. | Opium in powder .. .. | 1 in 10 | 2 to 5 grs. |
| **Tinctura** .. | Do. in coarse powder .. | 33 gr. in 1 oz. | 5 to 40 m. |
| **Tinct. Ammon.** | Do. Do. Do. .. | 5 gr. to 1 oz. | ½ to 1 dr. |
| **Trochisci** .. | Extract of Opium .. .. | 1-10 gr. each | 1 to 6. |
| **Vinum** .. .. | Extract of Opium .. .. | 22 gr. to 1 oz. | 10 to 40 m. |

## OS USTUM (Bone Ash).

The residue of bones which have been burned to a white ash in contact with air, consisting of phosphate of lime, with 10 per cent. carbonate of lime and a little fluoride of calcium and phosphate of magnesia.

Used in the preparation of phosphates of soda and lime.

## OVI VITELLUS (Yolk of Egg).

Of Gallus Banckiva. The common hen.

Enters into Mistura Spiritus Vini Gallici.

## OXYMEL and OXYMEL SCILLÆ. (See under Mel and Scilla).

## PAPAVERIS CAPSULÆ (Poppy Capsules)—Papaveraceæ.

The large, globular, crowned, dried, ripe capsules of the white poppy, Papaver somniferum. Grown in Britain.

Anodyne and Narcotic; resembling opium, but much more feeble.

### Decoctum Papaveris. 2 oz. to 1 pint.

Prepared by boiling poppy capsules 2 oz. in distilled water 1½ pint for ten minutes, and making the strained product to measure 1 pint.

Used as an Anodyne application to painful parts.

**Extractum Papaveris.**

A brownish-black extract, prepared by evaporating 1 gallon of an infusion of the seedless capsules (made by displacement) to 1 pint, and adding 2 oz. rectified spirit, filtering, and continuing the evaporation till a proper consistence is reached.

Dose—2 to 5 grs., in pill.

**Syrupus Papaveris.** 1 in 2½.

A dark-brown syrup, prepared by infusing and percolating 36 oz. of bruised poppy capsules, freed from seed, with 2 gallons of boiling distilled water, reducing the infusion by evaporation to 3 pints on a water-bath, and adding 16 oz. rectified spirit when cold; this liquid, after settling, is filtered, and the spirit distilled off till 2 pints are left behind, in which 4 lb. sugar are to be dissolved.

Anodyne and Narcotic.

Dose—1 dram; should not be given to very young children.

**PAREIRÆ RADIX** (Pareira Root)—Menispermaceæ.

The dried root of Cissampelos Pareira, in long, cylindrical pieces, from 1 to 5 inches thick, showing on cross section medullary rays and concentric rings. From Brazil; commonly called Pareira Brava.

Diuretic and Anodyne to the mucous lining of the bladder.

**Decoctum Pareiræ.** 1½ oz. to 1 pint.

Prepared by boiling sliced pareira root 1½ oz. in distilled water 1 pint for 15 minutes, and making the strained product to measure 1 pint.

Dose—1 to 2 oz.

**Extractum Pareiræ.**

A brownish-black extract, prepared by evaporating a strong infusion of pareira root by means of a water-bath.

Dose—10 to 20 grs.

**Extractum Pareiræ Liquidum.** 1 in 1.

An almost black liquid, prepared by evaporating an infusion made with 1 lb. of pareira root to 13 oz., and adding 3 oz. rectified spirit.

Dose—½ to 2 drs.

**PEPSIN** (Pepsine).

A light yellowish-brown powder, prepared by pulverising the carefully dried pulp obtained by scraping the mucous membrane of the fresh stomach of the pig, sheep, or calf.

An artificial Digestive.

Dose—2 to 5 grs., in powder, or in pill with glycerine.

## PHOSPHORUS (P).

A semi-transparent, colourless, wax-like, solid element, prepared from bones.

Nervine Tonic and Stimulant, especially to the kidneys and genital organs.

Dose—$\frac{1}{30}$ gr., in pill.

Used in the preparation of Acidum Phosphoricum Dilutum.

**Oleum Phosphoratum.** 1 in 160, or 3 grs. to 1 oz.

A clear, almost colourless oil, phosphorescent in the dark, prepared by heating 4 oz. almond oil to 300°, filtering when cold, and dissolving in it 12 grs. of phosphorus by a temperature of 180°, with constant agitation.

Dose—5 to 10 minims—*i.e.*, $\frac{1}{32}$ to $\frac{1}{16}$ gr. of phosphorus.

**Pilula Phosphori.** 1 in 91.

Prepared by rubbing together under water (at 140°) phosphorus 2 grs., balsam of tolu 120 grs., and yellow wax 60 grs., till thoroughly incorporated. The mass should be kept immersed in cold water.

Dose—3 to 6 grs.—*i.e.*, $\frac{1}{30}$ to $\frac{1}{15}$ of phosphorus.

## PHYSOSTIGMATIS FABA (Calabar Bean) — Leguminosæ.

The large, kidney-shaped, brown seed, with a furrow along its convex margin, of Physostigma venenosum. From Western Africa.

Causes contraction of the iris when applied locally, and general muscular paralysis when administered internally.

Dose—1 to 4 grs., in powder or in pill.

**Extractum Physostigmatis.**

A dark-brown soft extract, prepared by evaporating a strong tincture of Calabar bean made with rectified spirit.

Dose—$\frac{1}{16}$ to $\frac{1}{4}$ gr., in pill.

## PIMENTA (Allspice)—Myrtaceæ.

The small, round, rough, brown, dried, unripe berries of the allspice tree, Eugenia Pimenta. From the West Indies.

Stimulant and Carminative.

Dose—10 to 30 grs., in powder.

Enters into Syrupus Rhamni.

**Aqua Pimentæ.** 14 oz. to 1 gallon.

A brownish unstable preparation, obtained by mixing allspice 14 oz. with water 2 gallons, and distilling off one gallon.

Dose—1 to 2 oz.

**Oleum Pimentæ.**

An oil (colourless when prepared, but soon becoming brown) distilled in Britain from pimento or allspice; it sinks in water.

Dose—1 to 3 minims, in pill, or on sugar, or in an emulsion.

**PIPER NIGRUM** (Black Pepper)—Piperaceæ.

The small, round, wrinkled, brownish-black, dried, unripe berries of Piper nigrum. From the East Indies.

Aromatic, Stimulant, and Carminative.

Dose—10 to 20 grs., in powder.

In addition to the Confection, it enters into Confect. Opii and Pulv. Opii Co.

**Confectio Piperis.** 1 in 10.

An almost black paste, prepared by mixing black pepper 2 oz., caraway fruit 3 oz., with honey 15 oz. Resembles and is sometimes called Ward's paste, and is in repute as an internal remedy for hæmorrhoids.

Dose—1 to 2 drams.

**PIX BURGUNDICA** (Burgundy Pitch)—From Coniferæ.

A hard, brittle, yellow solid, being a resinous exudation from the stem of the Spruce fir, Abies excelsa. Imported from Austria (and not from Switzerland, as stated in the British Pharmacopœia).

A stimulating Expectorant; but seldom used except in plasters, to which it gives solidity, and imparts Rubefacient qualities.

It enters into Emplastrum Ferri and the following:—

**Emplastrum Picis.** 1 in 2.

A yellow solid, composed of Burgundy pitch 26 oz., frankincense 13 oz., resin and yellow wax of each 4½ oz., expressed oil of nutmeg 1 oz., olive oil and water of each 2 oz., melted, and evaporated with constant stirring.

A Rubefacient and Stimulating plaster.

**PIX LIQUIDA** (Tar)—From Coniferæ.

A brownish-black, thick, viscid, bituminous liquid, obtained by destructive distillation from the wood of Pinus sylvestris and other pines.

A Stimulating application (when diluted with wax, &c.) to chronic scaly skin affections.

**Unguentum Picis Liquidæ.** 5 in 7.

A black ointment, prepared by melting yellow wax 2 oz., and adding tar 5 oz., and stirring while the mixture cools.

**PLUMBI ACETAS** (Acetate of Lead). $Pb(C_2H_3O_2)_2$.

In white, crystalline, slightly efflorescent masses, obtained by dissolving oxide of lead 24 oz. in acetic acid 2 pints and distilled water 1 pint, with the aid of a gentle heat, filtering, evaporating, and setting aside till crystallisation takes place, known as "sugar of lead."

Sedative and Astringent. Used for restraining internal hæmorrhages.

Dose—1 to 4 grs., in solution or in pill.

As this salt forms insoluble precipitates, it should not be ordered with iodides, sulphates, or tannates. Used in the preparation of Strychnia.

**Pilula Plumbi cum Opio.** 3 of lead in 4, and ½ of opium in 4.

Prepared by beating into a mass acetate of lead 36 grs., opium 6 grs., confection of roses 6 grs.

Sedative, Narcotic, and Astringent.

Dose—3 to 5 grs.

**Suppositoria Plumbi Composita.** 3 grs. lead and 1 gr. opium in each.

Prepared by mixing acetate of lead 36 grs., opium 12 grs., benzoated lard 42 grs., white wax 10 grs., oil of theobroma 80 grs., and dividing into 12 cones.

Sedative, Anodyne, and Astringent.

**Unguentum Plumbi Acetatis.** (See table on page 184.)

**Plumbi Carbonas.** $2PbCO_3$ & $PbOH_2O$.

A soft, heavy, white powder, known as "white lead," of somewhat variable composition; not used internally; externally, mildly Astringent and Sedative.

Used in making Liquor Gutta-percha. (For the ointment see the table.)

**Plumbi Iodidum.** $PbI_2$.

A bright yellow crystalline powder, prepared by mixing solutions of equal quantities of nitrate of lead and iodide of potassium, collecting, washing, and drying the precipitate.

Resolvent and Antiparasitic.

**Emplastrum Plumbi Iodidi.** 1 in 9.

A bright yellow solid, composed of iodide of lead 1 oz., soap plaster and resin plaster of each 4 oz.

Alterative and Resolvent to chronic enlargements.

(For the ointment of iodide of lead see the table).

**Plumbi Nitras.** $Pb(NO_3)_2$.

In colourless, opaque, octahedral crystals, prepared by dissolving lead or litharge in nitric acid, and evaporating.

Used only to make the iodide.

**Plumbi Oxidum.** PbO.

A heavy powder, in brick-red scales, obtained by roasting lead in a current of air; commonly known as Litharge.

Not used internally, but employed in the making of Empl. Cerati Saponis, Liq. Plumbi Subacetatis, Plumbi Acetas, Digitalinum, and the following:—

**Emplastrum Plumbi** (Diachylon or Litharge Plaster).

A pale yellow solid, consisting of oleate, palmitate, and stearate of lead, and a little glycerine; it is, chemically speaking, a *soap*. It is prepared by boiling in a steam bath litharge (oxide of lead) 4 lbs., olive oil 8 pints, and water 3½ pints, for 4 or 5 hours, till a proper consistence is obtained.

A supporting Sedative and Protective application.

It enters into 10 plasters either as lead or resin plaster.

☞ The student should remember that of the 14 official plasters, 11 contain lead. The exceptions are E. Ammon. c. Hydrarg., E. Cantharidis, and E. Picis.

The following five plasters are often grouped together as the "Lead Plasters":—

Plumbi. Plumbi Iodidi.
Resinæ. Saponis.
Cerati Saponis.

The lead is in the form of oleate, palmitate and stearate, but chiefly as oleate. E. Cerati Saponis contains some acetate of lead in addition to the oleate.

**Liquor Plumbi Subacetatis.** $Pb_2C_4H_6O_5$. 27 per cent.

A colourless solution of subacetate of lead in water, prepared by boiling acetate of lead 5 oz. with oxide of lead 3½ oz. in distilled water 1 pint. It is called Goulard's Extract, and contains 27 per cent. of the subacetate.

Powerfully Astringent, but only used diluted, as in the following:—

**Liquor Plumbi Subacetatis Dilutus.** 2 drs. to 1 pint, or 1 in 80.

A colourless liquid, often called Goulard's Water, prepared by mixing solution of subacetate of lead and rectified spirit of each 2 drs. with distilled water 19½ oz.

Refrigerating and Astringent. Generally only used externally to bruises, &c.

**For the ointment see the following table of the**

### OINTMENTS OF LEAD.

| UNGUENTUM. | COMPOSITION. | COLOUR. |
|---|---|---|
| **Plumbi Acetatis,** $Pb\,(C_2H_3O_2)_2$. | Acetate of lead 12 grs., benzoated lard 1 oz. | White, 1 in 37½. |
| **Plumbi Carbonatis,** $2PbCO_3$ & $PbOH_2O$. | Carbonate 62 grs., simple ointment 1 oz. | Cream, 1 in 8. |
| **Plumbi Iodidi,** $PbI_2$. | Iodide (in fine powder) 62 grs., simple ointment 1 oz. | Orange, 1 in 8. |
| **Plumbi Subacetatis Compositum,** $Pb_2C_4H_6O_5$. | Solution of subacetate 6 oz., camphor 60 grs., white wax 8 oz., almond oil 20 oz. This is known as Goulard's cerate, and very soon becomes yellow and rancid. | Dirty white, 1 in 5¾. |

**PODOPHYLLI RADIX** (Podophyllum Root)—Ranunculaceæ.

The brown, wrinkled and knotted, dried rhizome, about the size of a quill, of Podophyllum peltatum. From North America. The powder is yellowish-grey. It is sometimes known as May-apple or Mandrake.

A powerful Cathartic and Stimulant to the liver.

Dose—10 to 20 grs., in powder; but seldom given in any form but the resin.

**Podophylli Resina** (Phodophyllin).

A pale greenish-brown powder, prepared by pouring a concentrated spirituous tincture of podophyllum root into water, acidulated with hydrochloric acid when the resin is precipitated; it is afterwards washed and dried.

Dose—¼ to 1 gr., in pill; generally combined with aloes, &c.

**POTASSA CAUSTICA** (Caustic Potash). KHO.

In hard, white, deliquescent rods or pencils, prepared by evaporating Liquor Potassæ and pouring the concentrated residue into moulds. Soluble in ½ its weight of water.

Acts as a powerful Caustic, extracting the water from the tissues and causing their death.

Is contained in Liquor Potassæ, and is used in making the Permanganate.

**Liquor Potassæ.** 27 grs. Caustic or Hydrate of Potash in 1 oz.

A colourless solution, prepared by boiling carbonate of potash 1 lb. with slaked lime 12 oz. and distilled water 1 gallon, when carbonate of lime is precipitated, and caustic potash remains in solution.

An Antacid, and in small doses a gastric Sedative.

Dose—15 to 60 minims, freely diluted with milk or barley-water.

**Used in making the Bromide and Iodide of Potassium and Soft Soap.**

**Potassa Sulphurata.** $K_2S_3$ & $K_2S_2O_3$.

Sulphurated potash, or Liver of sulphur, in dark-green or liver-coloured, hard, flat fragments, prepared by fusing together carbonate of potash and sublimed sulphur.

Narcotic, but seldom given internally; externally, Antiparasitic.

Dose—3 to 8 grs., swallowed in wafer-paper.

**Unguentum Potassæ Sulphuratæ.** 30 grs. to 1 oz.

A dirty-greenish ointment, prepared by triturating sulphurated potash 30 grs. with lard 1 oz. It rapidly decomposes.

Antiparasitic. Used in scabies, &c.

**Potassæ Acetas.** $KC_2H_3O_2$.

White, foliaceous, satiny, deliquescent masses, prepared by neutralising carbonate of potash with acetic acid, evaporating to dryness, and liquefying the residue. Soluble in nearly ¼ its weight of water.

Diuretic and mildly Cathartic.

Dose—10 to 60 grs. As a mild Cathartic 1 to 3 drs. may be given.

A safe medicine in the febrile conditions of infancy, given in doses of 1 to 3 grs to a child 1 year old.

**Used in the preparation of Tinctura Ferri Acetatis.**

**Potassæ Bicarbonas.** $KHCO_3$.

Colourless, right rhombic, prismatic crystals, obtained by passing carbonic acid gas, generated from white marble and hydrochloric acid, through a strong solution of carbonate of potash for a week. Soluble in 3 times its weight of water.

Antacid, Sedative, Diuretic, and Antilithic.

Dose—10 to 40 grs., in solution.

20 grs. are neutralised by 15 grs. of citric or tartaric acid—that is, by ¾ of its weight. (See under Acid. Citric.)

**Enters into Liquor Magnesiæ Citratis, and the following :—**

**Liquor Potassæ Efferveseens.** 30 grs. to 1 pint.

Potash or Kali water, being a solution of bicarbonate of potash 30 grs. in 1 pint water, into which 7 times its volume of carbonic acid gas is driven before corking.

Dose—5 to 10 oz.

**Potassæ Bichromas.** $K_2Cr_2O_7$.

Bichromate of potash, in large, red, transparent, four-sided tabular crystals. Not used internally.

Only introduced into the B.P. for the preparation of Sodæ Valerianas, and for testing strychnia (Otto's test), iron, &c.

**Potassæ Carbonas.** $K_2CO_3$.

A white, crystalline, deliquescent powder, obtained from commercial pearl-ash by washing with its own weight of distilled water, and evaporating the solution so formed to dryness. It is soluble in ¾ of its weight of water.

Action and dose similar to the Bicarbonate, only more irritating and Caustic.

It is used in the preparation of

Atropia.
Decoct. Aloes Co.
Enema Aloes.
Liquor Arsenicalis.
Liquor Potassæ.
Mist. Ferri Co.
Potassa Sulphurata.
Potassæ Acetas.
Potassæ Bicarbonas.
„ Chloras.
„ Citras.
„ Tartras.

**Potassæ Chloras.** $KClO_3$.

In colourless, rhomboidal, crystalline plates, prepared by passing washed chlorine gas (generated by the action of hydrochloric acid on black oxide of manganese) through a moist mixture of carbonate of potash and slaked lime. The chlorinated potash so formed is converted into chlorate by boiling with water, and crystallises out on cooling after evaporation.

Diuretic and Alterative to diseased mucous surfaces.

Dose—10 to 30 grs., in solution. 1 oz. is easily dissolved in 1 pint water.

It is used in the preparation of Potassæ Permanganas, and

**Trochisci Potassæ Chloratis.** 5 grs. in each.

White lozenges, consisting of chlorate of potash 3,600 grs., sugar 25 oz., gum acacia 1 oz., mucilage of gum acacia 2 oz., distilled water 1 oz., divided into 720 lozenges.

**Potassæ Citras.** $K_3C_6H_5O_7$.

A white granular powder, prepared by neutralising a solution of citric acid with carbonate of potash, filtering, and evaporating to dryness with constant stirring till the salt granulates.

A pleasant Refrigerant, Diaphoretic, and mild Laxative.

Dose—20 to 60 grs., in water (in which it is very soluble).

**Potassæ Nitras.** $KNO_3$.

In long, striated, prismatic crystals, or white crystalline masses, being nitrate of potash of commerce, purified, if necessary, by crystallisation from solution in distilled water—commonly called nitre or saltpetre. Soluble in 4 times its weight of water.

Diuretic, Diaphoretic, and Sedative.

Dose—10 to 30 grs., in solution.

**Potassæ Permanganas.** $KMnO_4$.

Dark-purple, slender, prismatic crystals, prepared by fusing together in a crucible, caustic potash, black oxide of manganese, and chlorate of potash until a green mass is formed, which contains manganate of potash. This, boiled with distilled water and the solution neutralised with sulphuric acid, gives permanganate of potash in solution, which is evaporated, and the crystals which form are again dissolved and allowed to recrystallise.

Caustic, Antiseptic, and Deodorant.

As it destroys all organic substances and decomposes most inorganic, it should be given only in distilled water (in 16 or 18 parts of which it is soluble).

**Liquor Potassæ Permanganatis.** 4 grs. in 1 oz.

A deep purple liquid, half the strength of Condy's fluid, prepared by dissolving permanganate of potash 4 grs. in distilled water 1 oz.

Dose—2 to 4 drs., in distilled water.

**Potassæ Prussias Flava.** $K_4FeC_6N_6$.

Large, transparent, yellow crystals, obtained by fusing refuse animal substances with carbonate of potash in an iron pot, lixiviating the crude product with water, and purifying the salt by crystallisation.

Used only in the preparation of Acidum Hydrocyanicum dilutum.

**Potassæ Sulphas.** $K_2SO_4$.

In colourless, very hard, six-sided prisms, terminated by six-sided pyramids.

A mild Cathartic; generally given with vegetable purgatives.

Dose—60 grs. (which is soluble in 1½ oz. of water).

Enters into Pilula Colocynth. Co. and Pulv. Ipecacuanhæ C

**Potassæ Tartras.** $K_2C_4H_4O_6$.

Small, colourless, prismatic crystals, prepared from cream of tartar by neutralising it with carbonate of potash in solution, evaporating, and drying the crystals.

A mild Hydragogue Cathartic and Diuretic.

Dose—60 grs. to ½ oz., in solution. Dissolves in its own weight of water.

**Potassæ Tartras Acida.** $KHC_4H_4O_6$.

Bitartrate or acid tartrate of potash, or cream of tartar in a gritty white powder, obtained from the crude tartar which is deposited during the fermentation of grape juice.

A Hydragogue Cathartic and Diuretic.

Dose—20 to 60 grs. As a purgative, ½ to 1 oz. (1 pint of water only dissolves about 50 grs.) It is elegantly administered with twice its bulk of orange marmalade.

It enters into the preparation of Tartaric Acid, Tartar Emetic, Confection of Sulphur, Compound Jalap powder, Tartrates of Iron, Potash, and Soda.

**Potassii Bromidum.** KBr.

Colourless cubical crystals, obtained by adding bromine to liquor potassæ, which forms a solution of bromide and bromate of potassium. This is evaporated to dryness, and the residue fused with charcoal, which converts the bromate into bromide, which is dissolved out with distilled water, concentrated, and allowed to deposit crystals.

Hypnotic and Sedative to the nervous system and larynx.

Dose—5 to 30 grs., in solution. Soluble in twice its weight of water.

**Potassii Iodidum.** KI.

Colourless cubical crystals, obtained by adding iodine to liquor potassæ, which forms a solution of iodide and iodate. This is evaporated to dryness, the residue pulverised, mixed with charcoal, and fused, and the product dissolved in distilled water, from which it is crystallised by evaporation.

Alterative and Resolvent in syphilis, chronic glandular enlargements, &c.

Dose—2 to 10 grs., in pill or solution. Soluble in less than its own weight of water.

The following preparations contain this salt in the following quantities per 1 oz.:—

Liniment. Iodi 22 grs.
Lin. Pot. Iod. cum Sapone 54⅔ grs.
Liquor Iodi 30 grs.
Tinctura Iodi 5½ grs.
Unguent. Iodi 16 grs.
Unguent. Potassii Iod. 50 grs.

**Linimentum Potassii Iodidi cum Sapone.** 1 in 8.

Prepared by mixing hard soap and iodide of potassium of each 1½ oz., glycerine 1 oz., oil of lemon 1 dram, distilled water 10 oz. Dissolve the soap in 7 oz. water by the heat of a water-bath, add the glycerine and iodide of potassium dissolved in the remainder, and, when cold, add the oil of lemon. If made as above it is a thick-looking liquid, which often separates on standing; if made with *curd* soap (which the B.P. also permits) it is a beautiful white, stiff paste. The above quantity weighs 115 drs., and measures 12¼ oz.; hence its strength by measure is 1 in 8.

Alterative and Resolvent, and does not stain the skin or soil linen.

**Unguentum Potassii Iodidi.** 50 grs. in 1 oz., or 1 in 8¾.

A white ointment, prepared by dissolving iodide of potassium 64 grs. and carbonate of potash 4 grs. in distilled water 1 dram, and adding lard 1 oz.

Acts similarly to the liniment.

**PRUNUM** (Prune)—Rosaceæ.

The fruit or drupe of the plum—Prunus domestica—dried in Southern France first by artificial heat and afterwards by the heat of the sun.

A mild Laxative, entering into Confectio Sennæ.

**PTEROCARPI LIGNUM** (Red Sandal-Wood)—Leguminosæ.

Dense, heavy, dark, reddish-brown billets, raspings, or chips of the wood of Pterocarpus santalinus. From Ceylon. The powder is blood-red.

Used only for colouring—Tinct. Lavandulæ Co.

**PYRETHRI RADIX** (Pellitory Root)—Compositæ.

The root of Anacyclus Pyrethrum, from the Levant, in pieces about the size of the little finger, with a brown bark studded with black points. Easily recognised by the prickling sensation when chewed.

Powerful Sialogogue, greatly increasing the flow of saliva.

**Tinctura Pyrethri.** 4 oz. to 1 pint.

A dark sherry-coloured liquid, prepared by percolating pellitory root 4 oz. with rectified spirit 1 pint.

Only used locally to promote the flow of saliva.

**PYROXYLIN** (Gun Cotton).

Resembling cotton wool in appearance, and prepared by mixing sulphuric and nitric acids 5 oz. each, and immersing cotton wool 1 oz. in the mixture for 3 minutes, transferring it to a vessel containing water, in which it is to be thoroughly washed, and dried in a water-bath.

Enters into Collodium and Collodium Flexile (which see).

**QUASSIÆ LIGNUM** (Quassia Wood)—Simarubaceæ.

The yellowish-white chips, or raspings or large dense billets of Picrœna excelsa. From Jamaica.

Bitter Tonic without Astringency; and, as it contains no tannin, it can be ordered with all the iron preparations.

**Extractum Quassiæ.** (Nearly 50 times the strength of the powdered wood.)

A black extract, prepared by evaporating a cold infusion of the wood.

Dose—3 to 5 grs., in pill.

**Infusum Quassiæ.** 60 grs. to 10 oz.—cold (½ hour).

Prepared by infusing quassia chips 60 grs. in cold distilled water 10 oz.

Dose—1 to 2 oz.

**Tinctura Quassiæ.** ¾ oz. to 1 pint.

A straw-coloured liquid, prepared by macerating quassia chips ¾ oz. in proof spirit 1 pint.

Dose—½ to 2 drams.

**QUERCUS CORTEX** (Oak Bark)—Cupuliferæ.

The dried bark, with shining grey epidermis and brown interior, of the small branches and young stems of the British oak, Quercus pedunculata. Collected in spring.

Astringent—containing tannic and gallic acids. Generally used externally.

Dose—½ to 2 drs. of the powder.

**Decoctum Quercus.** 1¼ oz. to 1 pint, or 1 in 16.

Prepared by boiling for 10 minutes, oak bark (bruised) 1¼ oz., distilled water 1 pint, and making the strained product to measure a pint.

Dose—1 to 2 oz.

**QUINIÆ SULPHAS** (Sulphate of Quinia). $(C_{20}H_{24}N_2O_2)_2 H_2SO_4$.

The sulphate of an alkaloid, in filiform, silky, snow-white crystals, prepared from the bark of Cinchona lancifolia and yellow cinchona bark, both belonging to the order Cinchonaceæ. It is prepared by exhausting the coarsely powdered bark in a percolator with water acidulated with $\frac{1}{70}$ of its bulk of hydrochloric acid, which dissolves out the quinia. To this solution is added solution of soda in *excess*, which precipitates the quinia, while the colouring matter, &c., remain in solution. The quinia, carefully washed, is dissolved in diluted sulphuric acid and water, on concentrating which it crystallises out. 12 grs. are equivalent in effect to 1 oz. yellow bark.

A bitter Tonic and Antiperiodic; devoid of Astringency.

Dose—As a Tonic, ½ to 2 grs.; as an Antiperiodic, 5 to 10 grs., in pill, or in solution with a dilute acid (about 1 minim to each grain).

**Pilula Quiniæ.** 4 grs. contain 3 of quiniæ sulphas.

A pale pink or nearly white mass, prepared by beating together sulphate of quinia 60 grs. and confection of hips 20 grs.

Dose—2 to 10 grs.

**Tinctura Quiniæ.** 160 grs. to 1 pint, or 1 gr. in 1 dram.

A dark golden, sherry-coloured liquid, prepared by dissolving with gentle heat sulphate of quinia 160 grs. in tincture of orange peel 1 pint.

Dose—½ to 2 drs.

**Tinctura Quiniæ Ammoniata.** 160 grs. to 1 pint, or 1 gr. in 1 dram.

A colourless liquid, prepared by dissolving sulphate of quinia 160 grs. in solution of ammonia 2½ oz. and proof spirit 17½ oz.

Dose—½ to 2 drs., freely diluted.

**Vinum Quiniæ.** 1 gr. in 1 oz.

A golden, sherry-coloured liquid, prepared by dissolving sulphate of quinia 20 grs. in orange wine 1 pint, to which citric acid 30 grs. is added.

Dose—½ to 1 oz.

**Ferri and Quiniæ Citras.** 6 grs. contain 1 gr. quinia. (See under Ferrum.

**RESINA** (Resin)—From Coniferæ.

The residue of the distillation of the turpentines from various species of Pinus, in translucent, brittle, shining masses.

Used chiefly for its adhesive qualities in 9 plasters; it also enters into Turpentine ointment and Blistering paper.

**Emplastrum Resinæ.** 1 in 9½.

A pale yellow solid, prepared by melting together resin 4 oz., lead plaster 32 oz., and hard soap 2 oz.

It enters into 4 plasters.

**Unguentum Resinæ.** 1 in 3½.

A yellowish-brown stiff ointment, prepared by melting together resin 8 oz., yellow wax 4 oz., and simple ointment 16 oz. Often called basilicon ointment.

A good stimulating application to indolent ulcers.

**RHAMNI SUCCUS** (Buckthorn Juice)—From Rhamnaceæ.

The dark green juice, which gradually becomes red, of the ripe berries of common Buckthorn—Rhamnus catharticus.

Purgative, causing watery motions, often with severe griping pain.

Dose—1 dram, but only given in the following form:—

**Syrupus Rhamni.** 1 of juice in 1 of syrup.

A deep-red syrup, prepared by evaporating fresh buckthorn juice 4 pints down to 2½, adding ginger and allspice of each ¾ oz., digesting for four hours with heat, cooling, adding rectified spirit 6 oz., decanting, and dissolving in the liquid sugar 5 lbs.

Dose—1 dram.

**RHATANIÆ** (Polygalaceæ). (See Krameriæ Radix.)

**RHEI RADIX** (Rhubarb Root)—Polygonacæ.

The dried root (deprived of its bark) of unknown species of Rheum, imported from China through Moscow, in yellow, irregularly-rounded pieces, bored with one hole, and internally mottled. The root is not fit for use till the plant is six years old. The powdered drug is a bright yellow.

Stomachic, Tonic, Cathartic, and afterwards Astringent.

Dose—5 to 20 grs., in powder, suspended with syrup and flavoured with peppermint. 3 grs. for a child 1 year old.

**Extractum Rhei.**

A brown elastic extract, prepared by evaporating an infusion of rhubarb (in which a little spirit is used) to a proper consistence, at a temperature not exceeding 160°.

Dose—5 to 15 grs.

**Infusum Rhei.** ¼ oz to 10 oz. (1 hour).

Prepared by infusing rhubarb root ¼ oz. in boiling distilled water 10 oz.

Dose—1 to 2 oz.

**Pilula Rhei Composita.** 1 in 4¼.

Prepared by beating together rhubarb root 3 oz., Socotrine aloes 2¼ oz., myrrh and hard soap of each 1½ oz., oil of peppermint 1½ drs., treacle 4 oz.

Dose—5 to 10 grs.

**Pulvis Rhei Compositus.** 1 in 4½.

A pale yellow powder, turning red when moistened, prepared by rubbing together rhubarb root 2 oz., light magnesia 6 oz., ginger 1 oz. Known as Gregory's powder.

Antacid, Stomachic, and Cathartic.

Dose—20 to 60 grs., in milk ; for a child 1 year old, 5 grs.

**Syrupus Rhei.** 1 in 13½.

A brown thick liquid, prepared by exhausting 2 oz. each rhubarb root and coriander fruit with distilled water 24 oz. and rectified spirit 8 oz., evaporating to 13 oz., adding 24 oz. sugar and dissolving with gentle heat.

Dose—1 to 4 or 8 drs.; ½ dr. for a child 1 year old.

**Tinctura Rhei.** 2 oz. to 1 pint.

A dark-brown liquid, prepared by percolating with proof spirit 1 pint, rhubarb root 2 oz., cardamoms freed from their pericarps, coriander, and saffron of each ¼ oz.

Dose—1 to 2 drs. as a Stomachic ; ½ to 1 oz. as a Purgative.

**Vinum Rhei.** 1½ oz. to 1 pint.

A brown liquid, prepared by macerating rhubarb root 1½ oz. and canella alba bark 60 grs. in sherry 1 pint, for 7 days.

Dose—1 to 2 drs.

**RHŒADOS PETALA** (Red Poppy Petals)—Papaveraceæ.

The fresh scarlet-coloured petals of Papaver Rhœas, from British plants.

Sedative and Anodyne, but so feeble that they may be regarded as colouring agents only.

**Syrupus Rhœados.** 1 in 3½.

A rich red syrup, prepared by making an infusion of 13 oz. fresh red poppy petals with distilled water 1 pint, in a water-bath, and in this dissolving sugar 2¼ lb., and adding rectified spirit 2½ oz.

Dose—1 dram.

**RICINI OLEUM** (Castor Oil)—From Euphorbiaceæ.

The viscid, almost colourless oil expressed from the seeds of Ricinus communis. From Calcutta.

A Cathartic, causing loose motions without being Hydragogue.

Dose—1 dr. to 1 oz. A child 1 year old may safely get 1 dram or even 2 drams.

Enters into Collodium Flexile, Linimentum Sinapis Co., and Pil. Hydrarg. Subchlor. Co.

**ROSÆ CANINÆ FRUCTUS** (Hips)—Rosaceæ.

The shining, ovate, scarlet, ripe fruit of the Dog rose, Rosa canina, and other indigenous allied species.

Feebly Astringent; chiefly used as a vehicle.

**Confectio Rosæ Caninæ.** 1 in 3.

A soft brownish mass, prepared by beating to a pulp 1 lb. of seedless hips, sifting, and adding twice their weight of sugar.

½ to 4 drams may be taken for a dose.

Used in making Pilula Quiniæ.

**ROSÆ CENTIFOLIÆ PETALA** (Cabbage Rose Petals) —Rosaceæ.

The fresh fully-expanded petals of the Rosa centifolia. Grown in Britain.

Though slightly Laxative, this medicine is introduced for its odour.

**Aqua Rosæ.** 10 lb. to 1 gallon, or 1 in 1.

The colourless fragrant water distilled from the fresh petals of the cabbage rose—10 lb. (or an equivalent of the dried petals preserved with salt) mixed with water 2 gallons, from which is to be distilled 1 gallon.

A vehicle for nauseous medicines, and an agreeable basis for lotions, gargles, eyewashes, &c.

Enters into Mist. Ferri Co. and Trochisci Bismuthi.

**ROSÆ GALLICÆ PETALA** (Red Rose Petals)—Rosaceæ.

The purplish-red, unexpanded petals, fresh and dried, of Rosa Gallica. Grown in Britain.

Astringent; chiefly used on account of their colouring.

**Confectio Rosæ Gallicæ.** 1 in 4.

" Confection of Roses," a soft, violet mass, prepared by beating together *fresh* red rose petals 1 lb. with sugar 3 lbs.

Used as a basis for pill masses.

It enters into the 5 pills bearing the name of Aloes, into Carbonate of Iron pill, Blue pill, and Lead and Opium pill.

**Infusum Rosæ Acidum.** ¼ oz. to 10 oz. (½ hour).

A bright red liquid, prepared by infusing *dried* red rose petals ¼ oz. in boiling distilled water 10 oz. and dilute sulphuric acid 1 dram.

Dose—1 to 2 oz. Makes a good basis for gargles, and is mildly Astringent.

**Syrupus Rosæ Gallicæ.** 1 in 17.

A red syrup, prepared from 2 oz. *dried* red rose petals by making an infusion with 1 pint boiling distilled water (for 2 hours), squeezing through calico, heating to the boiling point, filtering, adding 30 oz. sugar, and dissolving with gentle heat.

Dose—1 dram. Chiefly used for its bright red colour.

**ROSMARINI OLEUM** (Oil of Rosemary)—From Labiatæ.

The colourless oil distilled from the flowering tops of Rosmarinus officinalis.

Stimulant and externally Rubefacient.

Dose—3 minims, on sugar or in pill.

It enters into Liniment. Saponis and Tr. Lavand. Co., and the following—

**Spiritus Rosmarini.** 1 in 50.

A colourless liquid, consisting of oil of rosemary 1 oz. dissolved in 49 oz. rectified spirit.

Dose—½ to 1 dram, diluted.

**RUTÆ OLEUM** (Oil of Rue)—Rutaceæ.

The pale yellow oil distilled from the fresh herb of Ruta graveolens.

Stimulant, Antispasmodic, Emmenagogue, and Rubefacient.

Dose—3 minims, on sugar or in emulsion.

**SABADILLA** (Cevadilla)—Melanthaceæ.

The dried fruit of Asagræa officinalis, in three small follicles, open above, and containing the dark shining seeds. From Mexico.

A powerful Emetic, Cathartic, and Anthelmintic.

Dose—3 to 5 grs., in pill or powder, but seldom used except to make Veratria.

**SABINÆ CACUMINA** (Savin Tops)—Coniferæ.

The fresh and dried tops of Juniperus Sabina. Twigs covered with minute imbricated leaves in four rows. Collected in spring from British plants.

Emmenagogue, Anthelmintic, Diaphoretic.

Dose—5 to 10 grs., in powder.

**Oleum Sabinæ.**

The colourless or pale yellow oil distilled in Britain from fresh savin.

Dose—1 to 4 minims, on sugar or in emulsion.

**Tinctura Sabinæ.** 2½ oz. to 1 pint.

A brownish liquid, prepared by percolating dried savin tops 2½ oz. with proof spirit 1 pint.

Dose—20 minims to 1 dram.

**Unguentum Sabinæ.** About 1 in 3.

A green ointment, prepared by digesting fresh savin tops 8 oz. in a melted mixture of yellow wax 3 oz. and lard 16 oz., on a water-bath for twenty minutes, and squeezing through calico.

Used to keep blistered surfaces from healing.

**SACCHARUM LACTIS** (Sugar of Milk). $C_{12}H_{24}O_{12}$.

In white cylindrical masses or fragments of cakes, obtained from the whey of milk by evaporation.

Nutritive, and Sedative to the stomach, but generally used to dilute powders, as in Pulvis Elaterii Co.

Dose—1 to 4 drs. or more, in water or milk.

**SACCHARUM PURIFICATUM** (Refined Sugar). $C_{12}H_{22}O_{11}$.

Compact crystalline masses of pure cane sugar, prepared from the juice of the stem of Saccharum officinarum (Graminaceæ), grown in the West Indies.

Demulcent, but chiefly used for its sweetening properties.

It enters into all the syrups and lozenges, most of the confections, some mixtures, pills, and powders, one Liquor, and into Ferri Carb. Saccharata.

**Syrupus.** 6 in 7, or 1 in 1⅙.

A thick colourless liquid, prepared by dissolving sugar 5 lbs. in distilled water 2½ lbs. Its specific gravity is 1·330, which is about the average density of the syrups.

It enters into chalk and creasote mixtures, compound pill of gamboge, three syrups, and two confections.

**SAMBUCI FLORES** (Elder Flowers)—Caprifoliaceæ.

The small white flowers in cymes of Sambucus nigra, from indigenous plants.

Seldom employed, except as a Cosmetic to remove freckles from the skin.

**Aqua Sambuci.** 1 in 1 (same strength as Aq. Rosæ).

A colourless water, prepared by mixing fresh elder flowers 10 lbs., with water 2 gallons, and distilling 1 gallon. May be made with an equivalent quantity of the flowers preserved with salt.

A fragrant basis for skin lotions, &c.

**SANTONICA** (Santonica)—Compositæ.

The pale, greenish-brown, smooth, minute, unexpanded flower-heads of undetermined species of Artemisia, from Russia, and commonly known as worm-seed.

Anthelmintic.

Dose—10 to 60 grs., but generally given in the form of santonin, which is prepared from it.

**SANTONINUM** (Santonin).$C_{15}H_{18}O_3$.

The active principle of santonica; in minute, colourless, flat, and rhombic prisms, becoming yellow on exposure to light. Prepared by an intricate process, of which the following is an outline:—

*(a.)* Santonica is boiled with slaked lime and water, which forms a solution of santonate of lime. *(b.)* This liquid is concentrated by evaporation, and hydrochloric acid added to precipitate the santonin. *(c.)* The precipitate, after washing with water and ammonia, is dissolved in boiling spirit, to which charcoal is added; it is filtered and crystals form on cooling. *(d.)* These crystals are again dissolved in boiling spirit, and allowed to crystallise out on cooling. They are finally dried on filtering paper. No light should reach the crystals during the process.

Anthelmintic; killing the round and thread worms.

Dose—For an adult 2 to 6 grs., for a child 1 year, ½ to ¾ gr.; for a child 2 or 3 years old, 2 grs.; and above 4 years, 3 grs.

It should, if possible, always be given in a teaspoonful of castor oil, which greatly increases its efficacy and safety.

**SAPO ANIMALIS** (Curd Soap).

The white or greyish-white, horny, and brittle soap made with soda and a purified animal fat. It is chiefly composed of stearate of soda.

Mildly Laxative, but chiefly used for its physical qualities in making pill masses and suppositories. The last edition of the B.P. permits its use in the preparation of the Iodide of potassium with soap liniment, which is a decided improvement.

**Sapo Durus** (Hard or Castile Soap).

The dry, greyish-white soap, in appearance resembling curd soap, but made with olive oil and soda. It is an oleate of soda.

Antacid and Laxative.

Dose—5 to 15 grs., in pill.

**It enters into 7 pill masses, 1 extract, 3 plasters, and 2 liniments.**

**Sapo Mollis** (Soft Soap).

The yellowish-green, inodorous jelly, made with olive oil and potash, being an oleate of potash. Used in making Turpentine liniment.

**Emplastrum Cerati Saponis.** About 1 of soap in 6.

A brownish solid, prepared by heating oxide of lead 15 oz. with vinegar one gallon, till the oxide combines with the acid, then adding hard soap 10 oz., heating again till the most of the moisture is evaporated, adding yellow wax 12½ oz., and olive oil 20 oz., and evaporating to a proper consistence.

**Resembles closely the following—it contains oleate of lead. (See page 183).**

**Emplastrum Saponis.** 1 of soap in 7.

A white solid, prepared by melting hard soap 6 oz., resin 1 oz., and lead plaster 2¼ lbs., stirring and evaporating to a proper consistence.

A useful Strapping for swelled joints, &c., but only acts mechanically.

Enters into Empl. Calefaciens and Empl. Plumbi Iodidi.

**Linimentum Saponis.** 1 in 10.

A clear, straw-coloured liquid, prepared by macerating for 7 days hard soap 2½ oz., camphor 1¼ oz., and oil of rosemary 3 drs. in rectified spirit 18 oz., diluted with distilled water 2 oz.

A Stimulating application to bruises and sprains; known as "Opodeldoc."

Enters into Linimentum Opii.

**Pilula Saponis Composita.** 1 gr. opium in 6.

Prepared by beating together powdered opium ½ oz., hard soap 2 oz., distilled water q.s.

Narcotic. The name Pil. Saponis Co. is used to disguise its composition.

Dose—3 to 5 grs.

**Linimentum Potassii Iodidi cum Sapone.** (See under Potassii Iodidum.)

**SARSÆ RADIX** (Jamaica Sarsaparilla)—Smilaceæ.

The dried, long, slender, reddish-brown root, covered with rootlets, of Smilax officinalis, native of Central America. Imported from Jamaica.

An Alterative, Tonic and Diaphoretic.

Dose—½ to 2 drs., in powder.

**Decoctum Sarsæ.** 2½ oz. to 1 pint.

Prepared by infusing sarsaparilla root 2½ oz. in boiling distilled water 1½ pint for 1 hour, then boiling for 10 minutes, and making the strained product measure 1 pint.

Dose—2 to 10 oz.

**Decoctum Sarsæ Compositum.** 2½ oz. to 1 pint.

Prepared by digesting for 1 hour in 1½ pint boiling distilled water sarsaparilla root 2½ oz., sassafras, guaiacum, fresh liquorice of each ¼ oz., mezereon bark 60 grs., boiling for 10 minutes, and making the strained product measure 1 pint.

Dose and action same as the preceding.

**Extractum Sarsæ Liquidum.** 2 in 1.

A deep coffee-brown liquid, prepared by evaporating an infusion of sarsaparilla root 1 lb. (made with 14 pints distilled water at 160°) to 7 oz., and adding rectified spirit 1 oz.

Dose—2 to 4 drams.

**SASSAFRAS RADIX** (Sassafras Root)—Lauraceæ.

The dried, brown, branched root of Sassafras officinale, in pieces sometimes 8 inches in diameter, also in chips. From North America.

Stimulant and Diaphoretic. Only used to flavour Decoctum Sarsæ Co.

**SCAMMONIÆ RADIX** (Scammony Root) — Convolvulaceæ.

The dried, hard, tap-shaped roots, brown without, white within, of Convolvulus Scammonia. From Asia Minor.

A griping Cathartic.

Only used for making the following:—

**Scammoniæ Resina.**

The brownish, translucent, brittle, resinous solid, prepared by exhausting scammony or scammony root with warm rectified spirit, adding water (which throws down the resin), and then distilling off the spirit and drying the residue.

Dose—3 to 8 grs., in pill, or powder, or rubbed up with milk.

In addition to the following, it enters into Extract. Colocynth. Co.

**Mistura Scammonii.** 2 grs. to 1 oz.

A rich milky liquid, prepared by rubbing up scammony resin 4 grs., with milk 2 oz.

Dose—2 to 4 oz. For a child 1 year old, 1 to 2 drs.

**Pilula Scammonii Composita.** 1 in 3¼.

Prepared by dissolving resins of scammony and jalap of each 1 oz., curd soap 1 oz., in strong tincture of ginger 1 oz., and rectified spirit 2 oz., and evaporating to a proper consistence.

An energetic Cathartic.

Dose—5 to 15 grs.

**SCAMMONIUM** (Scammony).

A gum resin, obtained by incision from the *living* root of Convolvulus Scammonia, in ash-grey and rough, cinder-like, irregular fragments, with a black, shining, splintery, resinous fracture. Imported from Asia Minor.

A powerful Cathartic; generally combined with other purgatives.

Dose—5 to 10 grs., in powder, pill, or emulsion.

In addition to the following, it enters into Pil. Colocynth. Co. and Pil Colocynth. Co. et Hyoscyami.

**Confectio Scammonii.** 1 in 3.

A brownish, soft mass, prepared by mixing scammony 3 oz., ginger 1½ oz. (both in fine powder), oil of caraway 1 dr., oil of cloves ½ dram, syrup 3 oz., and honey 1½ oz.

Dose—10 to 30 grs.

**Pulvis Scammonii Compositus.** 1 in 2.

A brown powder, prepared by mixing and sifting scammony 4 oz., jalap 3 oz., ginger 1 oz.

An active Hydragogue Cathartic.

Dose—10 to 20 grs. 1 to 2 grs. for a child 1 year old.

**SCILLA** (Squill or Sea Onion)—Liliaceæ.

The dried, sliced, pear-shaped bulb or underground stem of Urginea Scilla, from the Mediterranean coasts; in dried, yellowish-white, tough, curved, dampish fragments.

Diuretic, Expectorant, and Emetic.

Dose—1 to 3 grs. of the powder, which is made by grinding the *freshly* dried bulb.

**Acetum Scillæ.** 2½ oz. to 1 pint, nearly.

A pale straw-coloured liquid, prepared by macerating squill 2½ oz. in dilute acetic acid 1 pint for 7 days, and adding proof spirit 1½ oz.

Dose—15 to 40 minims ; but generally given in the form of Syr. Scillæ.

**Oxymel Scillæ.**

A thick, opalescent, brownish liquid, composed of vinegar of squill 1 pint, clarified honey 2 lb., mixed and evaporated till the density of 1·32 is reached.

Dose—½ to 1 dram as an Expectorant ; 4 minims for a child 1 year old.

**Pilula Scillæ Composita.** 1 in 5.

Prepared by mixing and beating into a uniform mass squill 1¼ oz.; ginger, ammoniacum, and hard soap, of each (in fine powder) 1 oz., treacle 2 oz. or q.s.

Dose—5 to 10 grs., as an Expectorant and Diuretic.

**Syrupus Scillæ.** 1 of squill in 17.

A thick straw-coloured liquid, prepared by dissolving sugar 2½ lb. in vinegar of squill 1¼ lb.

Dose—½ to 1 dram as an Expectorant; 1 oz. as an Emetic.

For a child 1 year old, as an Expectorant, 5 mins.; as an Emetic, ½ to 1 dram.

As it contains acetic acid, it should not be ordered with alkalies. It is sometimes ordered by mistake with Spt. Ammon. Aromat.

**Tinctura Scillæ.** 2½ oz. to 1 pint.

A straw-coloured liquid, prepared by percolating bruised squill 2½ oz. with proof spirit 1 pint.

Dose—10 to 30 mins.

**Pilula Ipecacuanhæ cum Scilla.** (*Vide* Ipecacuanha.)

It contains 1 of opium, 1 of ipecacuanha, 3¼ of squill, and 3¼ of ammoniacum in 23¼ parts.

**SCOPARII CACUMINA** (Broom Tops)—Leguminosæ.

The fresh and dried tops, with their straight, angular, dark-green, smooth twigs, of Sarothamnus Scoparius, from indigenous plants.

An Unstimulating Diuretic; in large doses, Cathartic.

**Decoctum Scoparii.** 1 oz. *(dried)* to 1 pint.

Prepared by boiling for 10 minutes dried broom tops 1 oz. in distilled water 1 pint, and making the strained product measure 1 pint.

Dose—2 to 4 oz.

**Succus Scoparii.**

The brown juice obtained by bruising fresh broom tops in a stone mortar and adding to every 3 measures of the fresh juice 1 measure of rectified spirit.

Dose—1 to 2 drs.

**SENEGÆ RADIX** (Senega Root)—Polygalaceæ.

The dried, yellowish-brown, contorted root, about the size of a quill, with a keel along its whole extent, of Polygala Senega. From North America. (See under Valerian).

A Stimulating Expectorant and Emetic.

**Infusum Senegæ.** ½ oz. to ½ pint (1 hour).

Prepared by infusing senega root (bruised) ½ oz. in boiling distilled water ½ pint.

Dose—1 to 2 oz. Used as a basis for cough mixtures.

**Tinctura Senegæ.** 2½ oz. to 1 pint.

A brown-sherry coloured liquid, prepared by percolating senega root 2½ oz. in coarse powder with proof spirit 1 pint.

Dose—½ to 2 drs.

**SENNA ALEXANDRINA** (Alexandrian Senna)—Leguminosæ.

The greyish-green, lanceolate, or obovate leaflets, about one inch long, and unequally divided at the base, of Cassia obovata and Cassia lanceolata. From Alexandria. They should be carefully freed from Argel leaves, which are bitter, and have not an unequal oblique base.

Cathartic.

Dose—10 to 30 grs., in powder.

**SENNA INDICA** (Tinnivelly Senna)--Leguminosæ.

The green, lanceolate, acute leaflets of Cassia elongata, two inches long, with unequal and oblique base. From Southern India.

**May be used instead of Alexandrian senna (which it resembles in dose and action), to make any of the following preparations:—**

**Confectio Sennæ.** 1 in 11.

A soft blackish mass, composed of powdered senna 7 oz., powdered coriander 3 oz., figs 12 oz., tamarind 9 oz., cassia pulp 9 oz., prunes 6 oz., extract of liquorice ¾ oz., sugar 30 oz., distilled water 24 oz. or q.s.; prepared by boiling the figs and prunes in the water, adding the tamarind and cassia, rubbing the pulp through a sieve, in this dissolving the sugar and extract of liquorice and adding the powders, making the weight up to 75 oz. with distilled water. Sometimes called "Lenitive electuary."

A mild Cathartic, and in smaller doses Laxative.

Dose—1 to 2 drs.

**Infusum Sennæ.** 1 oz. to 10 (1 hour).

Prepared by infusing senna 1 oz., ginger 30 grs., in boiling distilled water 10 oz.

Dose—1 to 2 oz.

**Enters into Mist. Sennæ Co.**

**Mistura Sennæ Composita.** 1 of $MgSO_4$ in 5.

An almost black liquid, often known as "Black draught," consisting of sulphate of magnesia 4 oz., extract of liquorice ½ oz., tincture of senna 2½ oz., compound tincture of cardamoms 10 drs., infusion of senna to make up to 1 pint.

A valuable Hydragogue Cathartic.

Dose—1 to 1½ oz.

**Syrupus Sennæ.** 1 in 2.

A deep reddish-brown liquid, prepared by making an infusion of 1 lb. of senna with 5 pints of distilled water at 120°, evaporating to 10 oz., adding 2 oz. rectified spirit in which are dissolved 3 minims oil of coriander; filter, making the product measure 16 oz. by the addition of distilled water; in this dissolve 24 oz. sugar.

A mild Cathartic.

Dose—1 to 4 drams; a child 1 year old may get ½ to 1 dram.

**Tinctura Sennæ.** 2½ oz. to 1 pint.

An almost black liquid, prepared by percolating with 1 pint of proof spirit the following—senna 2½ oz., raisins freed from seeds 2 oz., caraway and coriander of each ½ oz.

Dose—1 to 4 drs.

**Pulvis Glycyrrhizæ Compositus.** 1 of senna in 5. (See Glycyrrhiza.)

**SERPENTARIÆ RADIX** (Serpentary Root)—Aristolochiaceæ.

A small, round, knotty, yellowish-white, dried rhizome, with numerous slender rootlets, of Aristolochia Serpentaria. From North America. (See under Valerian).

An Aromatic Tonic and Diaphoretic.

Dose—10 to 15 grs., in powder, but seldom used in this form

It enters into Tinct. Cinchonæ Co. and the following:—

**Infusum Serpentariæ.** ¼ oz. to 10 oz. (2 hours).

Prepared by infusing serpentary root ¼ oz. in boiling distilled water 10 oz.

Dose—1 to 2 oz.

**Tinctura Serpentariæ.** 2½ oz. to 1 pint.

A brown liquid, prepared by percolating serpentary root in coarse powder 2½ oz. with proof spirit 1 pint.

Dose—1 to 2 drs., diluted.

**SEVUM PRÆPARATUM** (Prepared Suet).

The white, smooth, internal fat of the abdomen of the sheep —Ovis Aries—purified by melting and straining.

Used to give proper consistence to Empl. Cantharidis and Ungt. Hydrargyri.

**SINAPIS** (Mustard)—Cruciferæ.

The small, globular, brown seeds of Sinapis nigra, and the larger, globular, yellow seeds of Sinapis alba, mixed and reduced to powder, which is greenish-yellow and pungent when moistened.

Emetic and Stimulant. Externally—Rubefacient.

Dose—1 to 4 drs. as an Emetic, in warm water.

**Cataplasma Sinapis.** 2½ oz. in 15 oz.

Composed of linseed meal 2½ oz., mixed gradually with boiling water 10 oz. and mustard in powder 2½ oz., stirred in.

**Charta Sinapis.** 1 in 3.

Prepared by mixing powdered black mustard seeds 1 oz. with solution of gutta-percha 2 oz., and coating over with the semi-fluid mixture one surface of strips of cartridge paper. Before being applied to the skin, they should be dipped for a few seconds into tepid water.

Rubefacient, and, if applied long enough, may Vesicate.

**Oleum Sinapis.**

The pale yellow pungent oil distilled with water from the seeds of Black mustard after the expression of the fixed oil.

A powerful Irritant, producing instant Vesication.

**Linimentum Sinapis Compositum.** 1 in 40.

A deep green liquid, prepared by adding oil of mustard 1 dram to castor oil 5 drs., and adding the mixture to ethereal extract of mezereon 40 grs. and camphor 120 grs., dissolved in rectified spirit 4 oz.

A Stimulating and Rubefacient application.

**SODA CAUSTICA** (Caustic Soda). NaHO.

In hard greyish-white fragments or sticks, prepared by rapidly boiling down solution of soda in a silver or clean iron vessel until an oily fluid consistence is reached, when it is poured out or run into moulds and allowed to solidify, and preserved in green glass bottles.

Powerfully Corrosive and Alkaline.

**It is contained in the following:—**

**Liquor Sodæ.** 18·8 grs. in 1 oz.

A colourless liquid, prepared by boiling carbonate of soda 28 oz. with distilled water 1 gallon, and gradually adding slaked lime 12 oz., and continuing the ebullition 10 minutes, when carbonate of lime falls to the bottom, and caustic soda remains in solution.

Antacid—in 20 minim doses. Seldom given internally.

**Used in the preparation of Sulphurated Antimony, Sulphate of Quinia, the Moist and Magnetic Oxides of Iron, Valerianate of Soda, Animal and Hard Soaps.**

**Soda Tartarata.** $NaKC_4H_4O_6$,

Or Tartarated Soda and Potash, in colourless transparent prisms, soluble in twice their weight of water, and, when powdered, commonly known as Rochelle Salt, prepared by adding cream of tartar to a hot strong solution of carbonate of soda, boiling, filtering, concentrating, and crystallising.

A Hydragogue Cathartic.

Dose—$\frac{1}{4}$ to $\frac{1}{2}$ or 1 oz. Lemonade or Ginger ale makes an agreeable vehicle.

☞ It forms the basis of Seidlitz Powders which contain in the blue paper $\frac{1}{4}$ oz. Rochelle salt mixed with 40 grs. bicarbonate of soda, and in the white paper 38 grs. tartaric acid.

**Sodæ Acetas.** $NaC_2H_3O_2$.

In transparent colourless crystals, having the same action and dose as Acetate of Potash.

Used in making Arseniate and Phosphate of Iron and Syrup of Phosphate of Iron.

**Sodæ Arsenias.** $Na_2HAsO_4$.

Colourless transparent prisms, soluble in twice their weight of water, prepared by fusing together white arsenic, nitrate of soda, and dried carbonate of soda, dissolving the fused product in boiling water, and setting the solution aside for the crystals to form.

Alterative and Tonic; possessing the properties of arsenic.

Dose $\frac{1}{16}$ to $\frac{1}{8}$ gr., in solution or in pill.

**Liquor Sodæ Arseniatis.** 4 grs. (dried), or 6·6 grs. in 1 oz.

A colourless solution of arseniate of soda (rendered anhydrous by a heat under 300°) 4 grs. in distilled water 1 oz.

Dose—5 to 10 minims, diluted, after meals.

**Sodæ Biboras.** $Na_2B_4O_7$. (See Borax.)

**Sodæ Bicarbonas.** $NaHCO_3$.

In white powder, or small, irregular, opaque, white scales, soluble in 10 times their weight of water, prepared by passing a stream of carbonic acid gas through or over a mixture of 3 parts of dried carbonate and 2 parts of crystallised carbonate of soda until the gas ceases to be absorbed. It is known as "baking soda."

Antacid and Sedative in large doses; often given in effervescence.

Dose—10 to 60 grs., in solution; 20 grs. make an effervescing draught when added to half an ounce of lemon juice. (See Citric Acid.)

Enters into Sodæ Citro-Tart. Efferves. and the following:—

**Liquor Sodæ Effervescens.** 30 grs. to 1 pint.

Prepared by passing pure washed carbonic acid, as much as can be introduced by the pressure of 7 atmospheres; into a solution of bicarbonate of soda 30 grs. in water 1 pint, and corking and tying over.

**Trochisci Sodæ Bicarbonatis.** 5 grs. in each.

White lozenges, composed of bicarbonate of soda 3,600 grs., sugar 25 oz., gum acacia 1 oz., mucilage of gum acacia 2 oz., distilled water 1 oz., in 720 lozenges.

Dose—1 to 6 lozenges.

**Sodæ Carbonas.** $Na_2CO_3$.

In large, transparent, colourless, rhombic crystals, soluble in twice their weight of water, obtained from the ashes of marine plants, or produced by chemical decomposition with chloride of sodium. It is known as "washing soda."

Antacid. 35 grs. neutralise about 17 of Citric Acid (which see).

Dose—5 to 30 grs., in solution.

**From it all of the soda salts are artificially obtained.**

**Sodæ Carbonas Exsiccata.** $Na_2CO_3$.

A white powder, obtained by strongly heating carbonate of soda and reducing the residue to powder. It only differs from the crystallised carbonate in being devoid of water of crystallisation, and is nearly 3 times stronger (3 grs. = 8 grs).

Dose—3 to 10 grs., in pill or powder.

**Sodæ Chloratæ Liquor.**

A colourless solution, containing bicarbonate and hypochlorite of soda and common salt; prepared by passing washed chlorine (generated from black oxide of manganese and hydrochloric acid) into a solution of carbonate of soda. Known as "Labarraque's disinfecting liquid."

Antiseptic, Disinfectant, and Stimulant; used Internally and Externally.

Dose—10 to 20 minims, diluted. As a gargle, ½ dr. to 1 oz.; as a lotion, 1 dr. to 1 oz.

**Cataplasma Sodæ Chloratæ.** 2 in 14.

Prepared by gradually mixing linseed meal 4 oz. with boiling water 8 oz. and adding solution of chlorinated soda 2 oz.

A Disinfecting and Deodorising application to foul wounds and ulcers.

**Sodæ Citro-Tartras Effervescens.**

A granulated white powder, being a mechanical mixture of bicarbonate of soda 17 oz., tartaric acid 8 oz., citric acid 6 oz., all in powder, heated between 200° and 220° until the particles begin to aggregate, and then assiduously stirred till they become granular. When added to water, brisk effervescence follows, and solution of citro-tartrate of soda is formed.

Dose—1 to 2 drs., as a Refrigerant and Laxative. It is commonly called "granular citrate of magnesia," through it does not contain any magnesia.

**Sodæ Hypophosphis.** $NaPH_2O_2$.

A white granular salt, soluble in twice its weight of water, obtained by adding carbonate of soda to a solution of hypophosphite of lime, filtering, and evaporating to dryness with constant stirring.

Dose—5 to 10 grs.

It is a Nervine Tonic, similar to Hypophosphite of lime.

**Sodæ Nitras.** $NaNO_3$.

A native salt, in colourless, obtuse rhomboids.

Used in the preparation of Nitric Acid and Arseniate of Soda.

**Sodæ Phosphas.** $Na_2HPO_4$.

In large, transparent, efflorescent, colourless, rhombic prisms, soluble in 5 times their weight of water, prepared by dissolving bone-ash ($Ca_3P_2O_8$) in sulphuric acid. Filter the solution of acid phosphate of calcium thus formed, and to the hot filtrate add a solution of carbonate of soda; filter, evaporate, and let the crystals form.

A mild Purgative and Diuretic.

Dose—¼ to 1 oz , in water, or beef-tea or soup, instead of salt. For a child 1 year old, 15 to 20 grs. make a safe, agreeable Purgative.

Used in making Ferri Phosphas and Syrup. Ferri Phosphatis.

**Sodæ Sulphas.** $Na_2SO_4$.

In large, transparent, oblique, efflorescent prisms, soluble in three times their weight of water, and known as "Glauber salt;" may be obtained from the residue left on making hydrochloric acid, by neutralising it with carbonate of soda, and crystallising from solution in water.

A mild Purgative; Hydragogue in large doses.

Dose—¼ to 1 oz., in solution, in water.

**Sodæ Valerianas.** $NaC_5H_9O_2$.

In dry white masses, with strong odour. Prepared by decomposing Amylic alcohol (fousel oil) with sulphuric acid and bichromate of potash, and saturating the valerianic acid thus formed with soda solution, and evaporating.

Antispasmodic in 5 grain pills, but only used in making Zinci Valerianas.

**Sodii Chloridum** (Common Salt). NaCl.

In small crystalline grains, or in transparent cubical crystals; generally obtained from the native rock salt.

Tonic, Purgative Emetic, and Anthelmintic.

Dose—10 grs. as a Tonic; ½ oz. or even 1 oz. as a Purgative.

Used in making Hydrochloric Acid, Calomel, and Corrosive Sublimate.

**SPIRITUS ÆTHERIS NITROSI** (Spirit of Nitre).

An almost colourless spirituous solution, containing nitrous ether ($C_2H_5NO_2$), prepared by cautiously heating together nitric acid 3 oz., sulphuric acid 2 oz., fine copper wire 2 oz., rectified spirit 1 pint, in a retort, the heat not rising above 180°, and to the 15 oz. which come over add 2 pints rectified spirit.

Diaphoretic, Diuretic, and Stimulant.

Dose—½ to 2 drams; 8 minims for a child 1 year old.

**Spiritus Ætheris.** 1 in 3. (See under Æther).

**SPIRITUS RECTIFICATUS** (Rectified Spirit). $C_2H_6O$.

The colourless, transparent, mobile liquid, consisting of alcohol, with 16 per cent. of water, obtained by the distillation of fermented saccharine fluids. S.g. ·838.

Stimulant, but more correctly a Narcotic.

☞ Rectified spirit is often spoken of as 56° over proof. This means that in order to reduce it to the strength of proof spirit (49 per cent.), 100 vols. must be mixed with water, until after contraction, they measure 156 vols. Nearly 60 vols. of water are necessary for this purpose.—*W. G. Smith's Commentary.*

1 part to 3 of water makes "Spirit Lotion."

**SPIRITUS TENUIOR** (Proof Spirit). 5 in 8. 49 per cent.

A colourless liquid, consisting of rectified spirit 5 pints and distilled water 3 pints; its S.g. is ·920.

**SPIRITUS VINI GALLICI** (Brandy).

Being the pale-brown liquid distilled from French wine, and generally containing about 50 per cent. of alcohol.

**Mistura Spiritus Vini Gallici.**

Often known as egg-flip; prepared by rubbing the yolks of two eggs with ½ oz. sugar, and adding brandy and cinnamon water of each 4 oz.

Nutritive, Restorative, and Narcotic.

Dose—1 to 2 oz.

**STRAMONII FOLIA** (Stramonium or Thorn Apple Leaves) Solanaceæ.

The large, green, ovate, sinuous, deeply-cut, dried leaves of Datura stramonium. Collected from British blossoming plants.

Antispasmodic and Narcotic; chiefly used in pulmonary disease and bronchial spasm.

Dose—1 to 2 grs., in powder or in pill.

**Stramonii Semina** (Stramonium Seeds)—Solanaceæ.

The small, brownish-black, kidney-shaped, ripe seeds of Datura stramonium.

Action and dose similar to that of the leaf.

**Extractum Stramonii.**

The soft blackish extract obtained by washing the coarsely-powdered seeds with ether to extract a fixed oil, after which a strong tincture is made, and evaporated to a suitable consistence.

Dose—¼ to ½ gr., in pill.

**Tinctura Stramonii.** 2½ oz. to 1 pint.

A brown liquid, prepared by percolating stramonium seeds (coarsely powdered) 2½ oz. with proof spirit 1 pint.

Dose—10 to 30 minims, diluted.

**STRYCHNIA** (Strychnia)—From Loganiaceæ. $C_{21}H_{22}N_2O_2$.

An alkaloid, in small, square, colourless octahedrons or prisms, prepared from Nux Vomica by the following method:—A tincture of Nux Vomica is made with hot spirit and water, and concentrated by evaporation, acetate of lead is added to the concentrated liquid after the spirit is evaporated, this throws down colouring matter, &c., and forms a solution of strychnia and brucia. After filtration the impure strychnia is precipitated by ammonia, redissolved in hot spirit, and the alkaloid crystallises out on cooling.

Tonic and Spinal Stimulant, resembling Nux Vomica.

Dose—$\frac{1}{30}$ to $\frac{1}{12}$ gr., in solution or in pill.

**Liquor Strychniæ.** 4 grs. in 1 oz.

A colourless solution of strychnia 4 grs., dilute hydrochloric acid 6 minims, in rectified spirit 2 drs. and distilled water 6 drs.

Dose—5 to 10 minims—viz., $\frac{1}{24}$ to $\frac{1}{12}$ gr.

**STYRAX PRÆPARATUS** (Prepared Storax)—Styraceæ.

A semi-transparent, brownish, semi-fluid resin or balsam, prepared from the bark of Liquidambar orientale, purified with spirit, and straining.

A Stimulating Expectorant, chiefly used in making Tinct. Benzoini Co.

Dose—10 to 20 grs.

**SULPHUR PRÆCIPITATUM** (Precipitated Sulphur). S.

A greyish-yellow soft powder, free from grittiness, prepared by dissolving sublimed sulphur by boiling with slaked lime, and then precipitating this with hydrochloric acid, washing carefully, and drying the precipitate. Often called "Milk of Sulphur."

A mild Laxative, but chiefly used as a Stimulant in skin diseases.

Dose—20 to 60 grs.

**Sulphur Sublimatum** (Sublimed Sulphur). S.

A gritty greenish-yellow powder, prepared by sublimation from crude or rough sulphur. Known as "Flowers of Sulphur."

Laxative and Antiparasitic.

Dose—20 to 60 grs., in milk or marmalade.

In addition to Emp. Hydrarg. and Emp. Ammon. cum Hydrarg. it enters into the following—

**Confectio Sulphuris.** 1 in 2½.

A soft yellow paste, prepared by rubbing together sublimed sulphur 4 oz., cream of tartar 1 oz., and syrup of orange peel by measure 4 oz. (or by weight 5 oz).

Dose—60 to 120 grs.

**Unguentum Sulphuris.** 1 in 5.

A yellow ointment, prepared by rubbing sublimed sulphur 1 oz. with benzoated lard 4 oz.

Antiparasitic ; used in itch, &c.

**Sulphuris Iodidum.** SI.

A greyish-black shining solid, prepared by heating together in a flask, iodine 4 oz. and sublimed sulphur 1 oz.

Only used to make—

**Unguentum Sulphuris Iodidi.** 30 grs. to 1 oz.

A yellow ointment, gradually becoming black, prepared by triturating iodide of sulphur 30 grs., and by degrees adding lard 1 oz., and rubbing till every trace of grittiness disappears.

An Antiparasitic and Stimulating application.

**SUMBUL RADIX** (Sumbul Root)—Umbelliferæ.

The dried, brown, spongy, odorous, transverse slices of the root of Euryangium Sumbul. From Russia and India. Commonly called "musk root."

Nervine Stimulant and Antispasmodic.

☞ Sumbul root is distinguished from Calumba, which it slightly resembles, by its open spongy texture and musky odour.

**Tinctura Sumbul.** 2½ oz. to 1 pint.

A brown-sherry coloured liquid, prepared by percolating Sumbul root (in coarse powder) 2½ oz. with proof spirit 1 pint.

Dose—10 to 30 minims.

**Syrupus.** (See Saccharum.)

**TABACI FOLIA** (Leaf Tobacco)—Solanaceæ.

The large, mottled-brown, hairy, ovate, dried leaves of Virginian tobacco, Nicotiana Tabacum. Grown in America.

Narcotic, Anodyne, Sedative, and Emetic.

**Enema Tabaci.** 20 grs. to 8 oz. (½ hour).

An infusion of leaf tobacco 20 grs. in boiling water 8 oz.

There is too much in this for one dose, only half should be used at once.

**TAMARINDUS** (Tamarind)—Leguminosæ.

The brown, sweetish, soft, fibrous pulp (containing brown shining seeds), of the fruit of Tamarindus Indica. From the West Indies.

Laxative and Refrigerant.

Dose—½ to 1 oz., or more.

It enters into Confectio Sennæ.

**TARAXACI RADIX** (Dandelion Root)—Compositæ.

The long, smooth, tapering, *fresh* tap root, or the dark-brown, wrinkled, *dried*, tap-shaped root of Taraxacum Dens Leonis—Dandelion—gathered between September and February. From British pastures.

Diuretic, Laxative, and Tonic, with little or no action on the liver.

**Decoctum Taraxaci.** 1 oz. (*dried*) to 1 pint.

Prepared by boiling for 10 minutes dandelion root (sliced and dried) 1 oz. in distilled water 1 pint, and making the strained product measure 1 pint.

Dose—2 to 4 oz.

**Extractum Taraxaci.**

A rich brown extract, prepared by evaporating the expressed juice of the fresh root.

Dose—5 to 30 grs., in solution in water, or in pill.

**Succus Taraxaci.**

A brown liquid, prepared by pressing out the juice from fresh dandelion root, and adding to every three measures, one measure of rectified spirit.

Dose—1 to 2 drs.

**TEREBINTHINA CANADENSIS** (Canada Balsam)—From Coniferæ.

The straw-coloured, ductile, oleo-resin, or turpentine (as thick as honey), obtained by incision from the stem of Abies balsamea—Balm of Gilead Fir. From Canada.

A Stimulating Expectorant; but seldom used except for its adhesive qualities.

Dose—20 to 30 grs., in pills made with ¼ their weight of magnesia.

**Enters into Charta Epispastica and Collodium Flexile.**

**OLEUM TEREBINTHINÆ** (Oil of Turpentine)—From Coniferæ.

The limpid colourless oil distilled from the oleo-resin (turpentine) obtained from Pinus palustris, Pinus Tæda and sometimes Pinus Pinaster.

Stimulant, Diuretic, Anthelmintic, and Cathartic. Externally—Rubefacient. The vapour, when inhaled, is Astringent.

Dose—10 mins. to 4 drs., on sugar, or with egg in an emulsion, or rubbed up with twice its bulk of mucilage, and water afterwards added.

**Confectio Terebinthinæ.** 1 in 4.

A pale-brown soft paste, prepared by triturating oil of turpentine 1 oz. with liquorice root (in powder) 1 oz., and adding honey 2 oz., with constant rubbing.

Dose—1 to 2 drs.

**Enema Terebinthinæ.** 1 in 16.

Prepared by mixing oil of turpentine 1 oz. with mucilage of starch 15 oz.

**Linimentum Terebinthinæ.** 16 in 19.

A pale yellowish emulsion, prepared by dissolving camphor 1 oz. in oil of turpentine 16 oz., adding soft soap 2 oz., and rubbing till thoroughly mixed.

A Stimulating application to the chest in pulmonary affections.

**Linimentum Terebinthinæ Aceticum.** 1 in 3.

A mixture of equal parts of oil of turpentine, acetic acid, and liniment of camphor; separates after a few minutes. It is known as "St. John Long's Liniment."

An excellent Rubefacient.

**Unguentum Terebinthinæ.** 1 in 2.

A brownish ointment, prepared by melting together oil of turpentine 1 oz., resin 60 grs., yellow wax and lard of each ½ oz., and stirring till cold.

A Stimulating application to chronic ulcers and burns.

**THEOBROMÆ OLEUM** (Cacao Butter)—From Byttneriaceæ.

The yellowish, solid, concrete oil, in cakes, expressed with heat from the ground seeds of Theobroma Cacao.

Used in the preparation of 4 Suppositories.

**THERIACA** (Treacle).

The thick, brown, uncrystallised, syrupy residue of the refining of sugar.

Only used for making pill masses, into 5 of which it enters.

**THUS AMERICANUM** (Common Frankincense)—From Coniferæ.

The bright-yellow, opaque, tough, solid turpentine of Pinus Tæda, the Frankincense pine, and Pinus palustris, the Swamp pine, obtained by making cavities in their trunks, into which it flows. From North America.

Externally—Stimulant.

Enters into Emp. Picis.

**TRAGACANTHA** (Tragacanth)—Leguminosæ.

A whitish gummy exudation, in horny, curved plates (like the parings of corns). Obtained from the stems of Astragalus verus, in Asia Minor.

Used only for its property of swelling out when moistened with water.

It enters into Pulv. Opii Co.

**Mucilago Tragacanthæ.** 60 grs. to 10 oz.

A thick opaque liquid, prepared by mixing powdered tragacanth 60 grs. with distilled water 10 oz.

**Pulvis Tragacanthæ Compositus.** 1 in 6.

A white powder, composed of tragacanth, gum acacia, and starch of each 1 oz., and sugar 3 oz.

Dose—As a Demulcent, 10 to 60 grs.

**ULMI CORTEX** (Elm Bark)—Ulmaceæ.

The dried, inner, tough, brownish, fibrous bark of Ulmus campestris, the broad-leaved Elm, from trees indigenous to and cultivated in Britain.

A feeble Bitter Tonic and Astringent.

**Decoctum Ulmi.** 2½ oz. to 1 pint.

Prepared by boiling for ten minutes elm bark 2½ oz. in distilled water 1 pint, and making the strained product measure 1 pint.

Dose—2 to 4 oz.

**UNGUENTUM SIMPLEX.** (See Adeps.)

**UVÆ URSI FOLIA** (Bearberry Leaves)—Ericaceæ.

The small, dried, brownish-green, shining, leathery leaves of Arctostaphylos Uva Ursi. From indigenous plants.

Astringent, Tonic and Sedative to the bladder.

Dose—10 to 30 grs., in powder.

**Infusum Uvæ Ursi.** ½ oz. to 10 oz. (2 hours).

Prepared by infusing bruised bearberry leaves ½ oz. in boiling distilled water 10 oz.

Dose—1 to 2 oz.

**UVÆ** (Raisins)—From Vitaceæ.

The ripe fruit of Vitis vinifera—the Grape vine—dried in the sun, or by artificial heat, in Spain.

Mildly Laxative.

Used only for Tinct. Sennæ and Tr. Card. Co.

**VALERIANÆ RADIX** (Valerian Root)—Valerianaceæ.

The dried yellowish rhizome, with numerous brushy bundles of fibrous roots springing from it, of Valeriana officinalis. From plants indigenous to and cultivated in Britain. Collected in autumn, wild plants being preferred.

An Antispasmodic and Stimulating Nervine Tonic.

Dose—10 to 30 grs., in powder.

☞ Valerian, Serpentary, Arnica, Hellebore, and Senega roots are often confounded, and the student should remember a few of the distinguishing points. Thus Senega, which is very like Serpentary and Valerian, is recognised by its keel or ridge, which is not marked on the smaller rootlets, but which may be seen, like a little mesentery, at the bendings of the roots, which are of a pure *white* colour internally. The rootlets of Serpentary are smaller than those of Valerian, and are destitute of the strong, unpleasant odour of that drug. Arnica is distinguished by its dark brown colour, aromatic odour, and peppery taste; Hellebore by its thick rootstock, and closely-set, long, yellowish-white rootlets, covered with characteristic indentations.

**Infusum Valerianæ.** 120 grs. to 10 oz. (1 hour).

Prepared by infusing bruised valerian root 120 grs. in boiling distilled water 10 oz.

Dose—1 to 2 oz.

**Tinctura Valerianæ.** 2½ oz. to 1 pint.

A dark brownish-red liquid, prepared by percolating valerian root in coarse powder 2½ oz. with proof spirit 1 pint.

Dose—1 to 2 drs.

**Tinctura Valerianæ Ammoniata.** 2½ oz. to 1 pint.

A very dark reddish-brown liquid, prepared by macerating valerian root in coarse powder 2½ oz. in aromatic spirit of ammonia 1 pint, for 7 days.

A powerful diffusible Stimulant.

Dose—½ to 1 dram, freely diluted.

**VERATRI VIRIDIS RADIX** (Green Hellebore Root)—Melanthaceæ.

The fleshy dried rhizome, with numerous yellowish, long roots attached, of Veratrum viride. Collected in autumn in North America.

A Drastic Purgative, Emetic, and Cardiac and Respiratory Sedative.

**Tinctura Veratri Viridis.** 4 oz. to 1 pint.

A brown liquid, prepared by percolating green hellebore root in coarse powder 4 oz. with rectified spirit 1 pint.

Dose—5 to 20 minims.

**VERATRIA** (Veratria).

An alkaloid, in pale grey, amorphous masses, or in powder, obtained from Cevadilla (Melanthaceæ) by adding a concentrated tincture of the seeds to water (which throws down resinous matters), and then precipitating the weak aqueo-spirituous tincture with ammonia, and purifying the precipitate by solution and re-precipitation.

It is not identical with the active principle of green hellebore, but it closely resembles it, depressing the heart and respiration, and acting as an Emetic and Cathartic.

Dose—$\frac{1}{20}$ to $\frac{1}{10}$ gr., but the Tinctura Veratri Viridis only should be ordered.

**Unguentum Veratriæ.** 8 grs. to 8½ drs., or 1 in 60.

A nearly white ointment, prepared by rubbing veratria 8 grs. with olive oil ½ dr., and adding prepared lard 1 oz.

Used in Neuralgia. It acts like Ungt. Aconitiæ.

**VINUM XERICUM** (Sherry).

A pale yellowish-brown Spanish wine, containing about 17 or 18 per cent. of alcohol; enters into all the wines but Aurantii, Quiniæ and Ferri Citratis—viz., into Aloes, Antimoniale, Colchici, Ferri, Opii, Rhei, and Ipecacuanhæ.

**ZINCUM** (Zinc)—Zn.

Zinc of commerce. A bluish-white, brittle metal, obtained by roasting the native sulphide (blende) or carbonate (calamine).

**ZINCUM GRANULATUM** (Granulated Zinc)—Zn.

Prepared by melting zinc, and pouring it in a thin stream into a two-gallon bucket of cold water.

**Zinci Acetas.** $Zn(C_2H_3O_2)_2$.

In thin, translucent, colourless, crystalline plates of a pearly lustre, soluble in less than twice their weight of water; prepared by dissolving carbonate of zinc in acetic acid, boiling, and setting aside till crystals form.

Tonic, Astringent, and Emetic; chiefly used as an injection in gonorrhœa. (2 grs. to 1 oz.)

Dose—1 to 2 grs. as a tonic; 15 to 20 as an Emetic.

**Zinci Carbonas.** $ZnCO_3(ZnO)_2$.

A white, insoluble powder; prepared by mixing strong, hot solutions of sulphate of zinc and carbonate of soda, boiling, washing, and collecting the precipitate.

Mildly Astringent; chiefly used as an ointment (Turner's cerate) for burns.

Dose—2 to 8 grs.

Employed in making the Oxide and Acetate of Zinc.

**Zinci Chloridum.** $ZnCl_2$.

In opaque, white, deliquescent rods or tablets; soluble in half their weight of water; prepared by dissolving granulated zinc in hydrochloric acid, and adding chlorine solution to the liquid, which will combine with any iron impurity, if present, and be precipitated as a brownish powder on adding carbonate of zinc, leaving the pure chlöride of zinc in solution, which is evaporated till a pellicle forms on its surface, and poured into moulds.

Only used externally as a powerful Caustic, mixed with 1, 2, or 3 parts of flour, or powdered starch.

**Liquor Zinci Chloridi.** 366 grs. in 1 oz.

A heavy colourless liquid, prepared like chloride of zinc, by boiling one pound of granulated zinc in 44 oz. hydrochloric acid and 20 oz. distilled water, filtering, and adding chlorine solution till its odour is retained. Carbonate of zinc is now added to precipitate the iron impurities attacked by the chlorine, and the filtered liquid is evaporated to the bulk of 40 oz.

Often spoken of as "Burnett's fluid" (which is only half its strength).

Used chiefly as a Disinfectant.

**Zinci Oxidum.** ZnO.

A soft, white, insoluble powder, prepared by exposing the carbonate in a loosely covered crucible to a dull red heat.

A Tonic in spasmodic nervous disorders. Externally—A mild Astringent, and Absorbent in weeping skin affections.

Dose—2 to 10 grs., in pill; often combined with belladonna in night sweating.

**Unguentum Zinci.** 80 grs. to 1 oz., or 1 in 6¼.

A white ointment prepared by adding oxide of zinc 80 grs. to melted benzoated lard 1 oz., and stirring till cold.

**Zinci Sulphas.** $ZnSO_4$.

In small, colourless, transparent, prismatic crystals, obtained by dissolving granulated zinc in diluted sulphuric acid, and purifying by adding chlorine and carbonate of zinc, filtering, evaporating, and setting aside for crystals to form.

☞ Often known as White Vitriol, and distinguished from Epsom salt (which it *closely* resembles) by its powerfully styptic taste.

Astringent, Emetic and Tonic in spasmodic nervous disorders.

Dose—1 to 3 grs. as a Tonic; 10 to 30 as an Emetic; 1 to 3 grs. to 1 oz. as an Injection.

Employed in making the Carbonate, and the following:—

**Zinci Valerianas.** $Zn(C_5H_9O_2)_2$.

In minute, brilliant, white, pearly, tabular crystals, with the odour of valerian, sparingly soluble; prepared by mixing strong hot solutions of sulphate of zinc and valerianate of soda; cooling, and skimming off the crystals which form.

Antispasmodic, Nervine Tonic, and Antiperiodic.

Dose—1 to 3 grs., in pill.

**ZINGIBER** (Ginger)—Zingiberaceæ.

The scraped and dried rhizome of Zingiber officinale, in irregular, lobed, yellowish-white, chalky pieces.

A stimulating Aromatic and Antispasmodic.

Dose—10 to 20 grs., in powder.

**Syrupus Zingiberis.** About 1 in 26.

A straw-coloured muddy syrup, prepared by adding strong tincture of ginger 6 drs. to syrup 19 oz.

Dose—1 dr.

**Tinctura Zingiberis.** 2½ oz. to 1 pint.

A brown, sherry-coloured liquid, prepared by percolating ginger in *coarse* powder 2½ oz. with rectified spirit 1 pint.

Dose—15 to 60 mins., diluted.

**Tinctura Zingiberis Fortior.** 10 oz. to 1 pint.

A brownish-red liquid, prepared by percolating ginger in *fine* powder 10 oz. with rectified spirit 1 pint (without previous maceration).

Dose—5 to 20 mins.

In addition to the above, Ginger enters into 12 Pharmacopœial preparations.

# NON-OFFICIAL REMEDIES.

**The following are a few of the most generally known Medicines which have not yet found their way into the Pharmacopœia:—**

**Acidum Boracicum**—Prepared from Borax by acting on it with sulphuric acid—is a valuable antiseptic; used as a lotion, 1 dram to 4 oz., or as "Boracic Lint."

**Acidum Chrysophanicum**—The active principle of Goa powder or Araroba, which is obtained from a tree of the order Leguminosæ. It was introduced by Squire for psoriasis, and is the best known application to this troublesome disease. An ointment of 1 dram to 1 ounce of vaseline, to be rubbed in twice a day, often cures the disease in a surprisingly short time. It is not clear how the remedy acts; some suppose it affects the disease after its absorption into the blood. The writer tried the following experiment repeatedly:—He had one limb or one side of the body treated by applications of the ointment to hospital patients, the corresponding parts being similarly treated with lard, or left untouched. The diseased spots to which this remedy was applied generally rapidly improved, while the corresponding ones remained unaltered.

**Acidum Chromicum** is used, mixed with its own weight of water, as a caustic for epithelial and superficial growths. One grain dissolved in 6 oz. distilled water makes an effectual antiseptic dressing for foul wounds.

**Acidum Hydrobromicum**—Introduced by Fothergill as a remedy for the nervous excitability of hysteria, protracted headaches, and in various exhausting nervous diseases, especially in ovarian neuralgia. It can be well combined with quinia, which it dissolves, and it will be found more active and satisfactory than the bromide of potassium.

Dose—20 to 60 minims; may be given with 1 grain quinia.

**Acidum Lacticum** is used, when diluted with about six parts of water, as a local application to the throat in malignant scarlatina and diphtheria, or half this strength as a spray. It is given in atonic dyspepsia in 15 minim doses, in water.

**Acidum Salicylicum**—An acid prepared from the *willow*, or *phenic* acid—is a powerful antipyretic. It possibly destroys the minute organisms in the blood, upon whose presence the increase of body heat depends. It is highly beneficial in acute rheumatism, and its good effects show themselves within 48 hours. It must be given boldly, and its action carefully watched, 15 grains every hour for five or six hours, then three, four, or six times a day, as the temperature indicates. It is best given with a little glycerine in distilled water; and Squire finds that 1 oz. of water will dissolve 20 grs. of the acid if an equal quantity of acetate of potash is added.

The Salicylate of Soda is given in a similar way. It is not so likely to disagree with the stomach, but it is not so certain in its action. The same may be said of Salicin.

It is important in ordering salicylic acid that the *natural* acid should be specified. The letters "ver." distinguish it.

**Actæa Racemosa** (Black Snake Root) enjoys with some a high reputation in chronic rheumatism, especially when the muscles alone are involved. It is used in neuralgia and chorea.

Dose—30 minims of the tincture (1 in 4) or 3 grs. of the resin —Cimifugin.

**Apomorphiæ Hydrochloras** is derived from Morphia, and is a powerful emetic. $\frac{1}{20}$ to $\frac{1}{12}$ gr. hypodermically, produces vomiting in about 10 minutes. It is useful in croup, diphtheria, and bronchitis, where a speedy emetic is needed.

**Baptisin.**—A purgative and emetic principle, obtained from the Wild Indigo. It is both an intestinal and hepatic stimulant, and has been found useful in amenorrhœa. It is highly advocated by some American physicians in low typhoid states, and gangrene. Sprinkled upon fetid or sluggish sores, it is a powerful stimulant, and promotes healthy action.

Dose -1 to 5 grains in pill.

**Caffeine** closely resembles, or is identical with, Theine, the active principle of tea and coffee. It is used in case of sick headache. One grain is an average dose, either by mouth or injected hypodermically, dissolved in a little spirit and water. The granular effervescing citrate, each dram of which contains 1 grain citrate of caffeine, is an elegant preparation.

**Calcii Sulphidum**—the Sulphide of Calcium—is used for acne and for all suppurative conditions of the system, and is especially indicated in boils, Ringer speaks very highly of it —in doses of $\frac{1}{10}$ grain every hour, or every two hours—for arresting suppuration. It may be given in pill, with tragacanth.

**Camphora Monobromata** is used in various irritable conditions of the nerve centres, as in delirium tremens, chorea, neuralgia, and hysteria.

Dose in pill—5 to 8 grains.

**Casca Bark** has been made the subject of a series of able experiments by Brunton and Pye, and promises to become a more valuable drug than Digitalis, which it closely resembles in its physiological effects. The dose is not yet determined.

**Chlorodyne**—The various preparations under this name have been in such constant use that many physicians order chlorodyne frequently. It is a complex preparation, containing morphia, Indian hemp, chloroform, capsicum, prussic acid, oil of peppermint, &c. It is a powerful anodyne, narcotic and antispasmodic, in doses not exceeding 30 minims.

**Cocculus Indicus**—The dried fruit of Anamirta cocculus—is a powerful narcotic. It is given in various forms of paralysis. Picrotoxine, its alkaloid, is now used for the relief of the night-sweats of phthisis, and promises to succeed where the older remedies fail. Dr. Murrell gives it in doses of about $\frac{1}{100}$ gr., three times a day.

**Croton-Chloral Hydrate** is introduced for its specific influence over neuralgic conditions of the fifth nerve. It has very little, if any, hypnotic properties.

Dose—5 to 10 grains in pills.

**Curare or Woorara**—The South American Arrow Poison—Is the product of various plants, some of which are unknown. Strychnos and cocculus contribute to its terrible potency. Injected hypodermically or directly into the blood-stream curare produces great muscular relaxation, and, if the dose be large, general muscular paralysis soon results, and death from stoppage of the respiration. It has been used with success in tetanus, and apparently in hydrophobia.

Dose—10 to 15 minims of a solution of 1 grain of the poison in 2 drams distilled water, injected every two hours.

**Duborsea Myoporoides,** a valuable South Australian plant, resembling belladonna in its action, and used by ophthalmic surgeons to dilate the pupil. The sulphate of the alkaloid, of half the strength of the atropia solution, is a more satisfactory drug to cause dilatation of the pupil than atropia, it acts rapidly.

**Ergotine**—A pure watery extract, containing the active principle of ergot of rye. It is invaluable in uterine and other hæmorrhages, where it can be given hypodermically, when the stomach is unable to retain any remedy.

12 grains dissolve in 1 dram distilled water; and of the solution, from 5 to 10 minims may be injected every 3 or 4 hours.

**Eserine** — the alkaloid of Calabar bean — is a valuable remedy in chorea, but, its dangerous properties prevent its frequent or general use; $\frac{1}{30}$ grain has been injected with success in this disease. A few drops of a 2 grain solution of the sulphate in 1 oz. water, cause contraction of the pupil, and prevent suppuration in the cornea when this structure is acutely inflamed. It is useful in strumous ophthalmia.

The Salicylate of eserine possesses all the advantages of the alkaloid or its sulphate, and is much less liable to decompose or spoil in solution.

**Eucalyptus Globulus** has a powerful depressing effect upon the spinal cord and medulla, which it paralyses after a slight stimulating action. Death is caused by paralysis of the respiratory centre. It possesses antiseptic and antiperiodic properties—like quinia, only much less reliable—and is used in pulmonary gangrene and catarrhal affections of the bladder.

Dose—Of the oil, 10 minims; of the tincture, 30 minims.

**Euonymin** is one of the American Eclectic remedies. It is obtained from Wahoo bark, and possesses mild aperient, expectorant, and diuretic powers. It is a valuable remedy in the treatment of habitual constipation. Dr. Rutherford's experiments prove it to be a powerful hepatic stimulant, and it has been used with success in dropsy, and torpidity of the liver.

Dose—$\frac{1}{2}$ to 2 or 3 grains.

**Fucus Vesiculosus**—The fluid extract of this plant, the "bladder sea-weed"—is largely used for obesity. Its physiological action is not well understood, and its effects are very uncertain. Some authorities deny its power in diminishing the fatty tissue of the body, and it is a rather significant fact that the plant itself is a good fattening food for pigs.

The liquid extract is taken in doses of one dram.

**Gelsemin**—Is the American Eclectic preparation of gelsemium. It should only be given in doses of $\frac{1}{2}$ grain, and is highly recommended in fevers, dysentery, spasmodic diseases, and hæmorrhages of all kinds.

**Gelsemium Sempervirens** (Yellow Jessamine)—This powerful remedy has been proved of very great benefit in the treatment of neuralgia, especially of the fifth nerve. Its action is more certain upon the branches supplying the lower jaw. Large doses produce complete loss of voluntary movement, and general anæsthesia; the respirations become diminished in number, and weakened in force, and death occurs from asphyxia. A local application causes rapid and marked dilatation of the pupil, whilst moderate doses internally cause contraction. From its depressing effect upon the respiratory function in full doses it is invaluable in the hæmoptysis of phthisis.

Dose of the Tincture (2 oz. to 1 pint) 10 to 30 minims—15 minims will be found a sufficient quantity in most cases.

**Grindelia Robusta** is much used in America as a remedy in asthma, and an antidote for Rhus Toxicodendron.

Dose—3 grs. of the extract thrice daily, or 30 minims of the *fluid* extract every half hour to cut short the asthmatic attack.

**Guarana** is the powdered seeds of Paullinia sorbilis. It is used as a remedy in migraine, in doses of 30 grains or 20 minims of the fluid extract.

**Hamamelis Virginica** (Witch Hazel)—The American Eclectic preparation Hamamelin is much used in 2 gr. doses in gonorrhœa, leucorrhœa, cystis, &c. It is astringent and diuretic, and is very useful in passive hæmorrhages.

**Hydrastis Canadensis** (Yellow Root) is a bitter tonic and antiperiodic ; useful in various conditions, depending on loss of tone in the stomach or intestines.

Dose—1 to 2 grs. of the Eclectic Hydrastin.

**Iodoform** acts somewhat like a salt of iodine. It has been found invaluable as a local application to chancres, dusted as a fine powder over the sore. It has been given internally in sciatica and syphilis, and ʒi to ℥i Glycerine will be found the best application to cancer of the uterus.

Dose—2 grs., if necessary rubbed up with mucilage ; musk covers its flavour.

**Iridin**—The American Eclectic preparation from the Blue Flag. It is used as an alterative in scrofula and syphilis, and as a diuretic in dropsy. Dr. Rutherford's experiments prove it to be a powerful hepatic and intestinal stimulant.

Dose—½ to 4 grs.

**Jaborandi** and its alkaloid **Pilocarpin** are powerful sialogogue and diaphoretic remedies. A full dose, either swallowed or injected under the skin, cause, in a few minutes, profuse sweating, with very great increase in the salivary secretion, and flushing of the face. The sweating and salivation continue often profusely for 2 or 3 hours, and probably depend upon direct stimulation of the vaso-dilator nerves of the skin and salivary glands. The amount of waste products, urea, &c., thus eliminated, has led to the use of this drug in various diseased conditions of the kidney, dropsy, &c.

Dose—1 oz. of the unstrained Infusion (½ oz. leaves to 10 oz.)
Dose of Pilocarpin ½ gr., or ⅓ gr. hypodermically.

**Leptandrin** is the Eclectic preparation from Veronica Virginica. It is prized for its stimulating influence over the liver, whilst its tonic properties render it of much service in dysentery, dyspepsia, and chronic pulmonary affections.

Dose—2 to 4 grs.

**Lupulin** contains the aromatic bitter principle of the hop, and possesses some hypnotic properties. It is used as a nervine tonic in hysteria, delirium tremens, &c.

Dose—3 to 8 grs.

**Muscarin**—the active principle of Poisonous Fungi—resembles closely jaborandi in producing profuse salivation and sweating. At the same time, it markedly increases the intestinal, hepatic, and pancreatic secretions, and, by causing contraction of the pulmonary vessels, leads to great dyspnœa.

Dose—$\frac{1}{3}$ to $\frac{1}{2}$ grain, hypodermically.

**Nitroglycerin** or **Glonoin** is a powerful poison, causing death by paralysing the muscles of respiration. Dr. Murrell has found it to give relief in angina pectoris in $\frac{1}{100}$ gr. doses.

**Propylamine**—A volatile principle obtained from fish oils and herring brine—is highly praised in acute and sub-acute rheumatism in doses of 2 grs. every two hours in peppermint water and sugar. It is found to reduce the frequency of the pulse and lower the temperature.

**Sanguinaria Canadensis** (Blood-root) lessens arterial tension, diminishes reflex excitability and the cardiac contractions, and in large doses paralyses the respiratory muscles. Its active principle (Sanguinarin) is given in acute bronchitis and pneumonia, and in catarrhal stomach affections, it acts somewhat like veratrum.

Dose—Of the root 1 to 2 grs., of the Sanguinarin $\frac{1}{2}$ gr.

**Santalis Flav. Oleum**—The essential oil of red sandalwood is much used for its specific action on the mucous membrane of the urethra, acting like copaiba, in gonorrhœa and gleet.

Dose—$\frac{1}{2}$ dram in emulsion, with 1 dram mucilage, and $\frac{1}{2}$ oz. syrup and water.

**Sodii Ethylas** has been highly praised as an application to nævi and to the poisoned wounds of rabid animals. Its effects are, however, too transitory to be useful.

**Staphisagriæ Semina**, or their active constituent (Delphinine) are active poisons. The former made into an ointment by heating with lard is a valuable remedy for the destruction of pediculi. The latter, in $\frac{1}{10}$ grain doses, is advocated in neuralgia of the face.

may be occasionally seen in some cases, the mucus becomes clear, though still pretty tenacious. Chloride of ammonium, gelatine, various potash and soda salts, act in a similar way.

In chronic bronchitis with very profuse discharge, or in pulmonary cavities, these remedies have little effect, but in ordinary catarrh, after the acute stage, they will be found very useful if persisted in, and they run no risk of upsetting the digestion. It becomes a difficult question as to the way in which these substances act. One thing, however, is certain, that it is not by absorption, since the same effect, though in a *much less* degree, may sometimes be produced by sucking substances absolutely insoluble, as bits of glass, rubber, &c., and some of the soluble remedies produce no effect when swallowed in mixtures even in large doses; so that one is forced to the conclusion that they act by reflex action. Two conditions appear necessary to produce a decided effect upon the secretion, viz.—the substance should be *soluble* in the fluids of the mouth, and should produce an impression upon the nerves of taste different from that continually being caused by food. Sugar, for instance, will not affect the secretion, but if flavoured with an essential oil, it appears to possess some power.

The impression produced upon the terminal filaments of the glosso-pharyngeal or the lingual branch of the fifth nerve is conveyed to the centre in the medulla, whence it probably is communicated by branches of the vagus, or through the sympathetic system to the mucous membrane, or bronchus, in which it may effect nutritive, secretory, or motor changes. To pursue the subject further and inquire into the nature of these changes would be, with our present knowledge, only to enter into the region of speculation. It is, however, a well-established fact that the impression made upon the nerves of sight by seeing tempting food, or upon the nerves of smell by inhaling its odour, will cause copious secretion of gastric juice in the stomach; and the action of an irritating emetic will stimulate all the glandular apparatus of the respiratory tract, and greatly increase the quantity of bronchial mucus, as well as cause its dislodgement by its mechanical effect.

It is generally maintained that ciliary motion is quite independent of direct nervous control, and this is based chiefly upon its persistence after death, and its resistance to poisons, electricity, &c., but a careful study of the action of various drugs sucked in the mouth would lead one to suppose that they possibly acted in some way upon the cilia lining the respiratory tract, probably through the indirect action of the nervous system stimulating them to brisker and stronger movements, sweeping up secretions which, on account of their tough and adhesive properties, are with extreme difficulty and slowness carried along the membrane.

It is, however, possible that such secretory changes take place in the mucous surface, through the action of the trophic nerves of the part, as might cause the secretion to become less viscid (though it does not appear so), or the membrane more moist, whereby the cilia would be permitted to move more easily and quickly, and hurry along the secretion; in either case the result is the same. As the effects of this class of remedies are constant when used in suitable cases, the name of "Ciliary Excitants" is proposed as a convenient term in referring to them, though it is open to the serious objection of implying a mode of action which is possibly, after all, only a conjecture.

As will be explained in speaking of some expectorants, the probability of any remedy acting as an expectorant and increasing the quantity of bronchial secretion without influencing the cilia is very slight. The cilia are parts of the same cell, the office of which is to secrete the mucus, and it is hardly in keeping with our present knowledge to suppose that the functional activity of the cells would be increased without influencing their prolongations—the cilia—even though the process of secretion should end in the death of the cell. The elegant compressed tablets of WYETH afford the best possible means of administering ciliary excitants.

**Acidum Aceticum and Acetum**—Acetic acid possesses some properties in common with the mineral acids (only of a feebler type), which will be discussed under their names. It is refrigerant when given freely diluted—that is, it allays thirst and fever. There is no evidence that the temperature falls, but a grateful *feeling* of coolness and comfort follows its administration. It is supposed to allay thirst by increasing the salivary secretion ; it is mildly astringent and diuretic ; and when taken internally or applied externally, it checks perspiration. Acetum is the more palatable form for the internal use of acetic acid. Externally, acetic acid and glacial acetic acid are caustics, and will produce redness, vesication, and sloughing, in proportion to the strength of the acid and the duration of its application. Both the acids dissolve epithelium, and are used to destroy warty growths ; and they have been highly recommended as local remedies in cancer, with the intention of *dissolving* the cancer cells. A weak solution of acetic acid or vinegar sponged over the body in fevers is of use in lowering the temperature, probably by reflex action. When applied undiluted to ringworm it kills the parasite.

The prolonged use of this acid diminishes the number of the red blood corpuscles, causing anæmia and loss of weight, and it is improperly used to correct obesity.

**Acidum Arseniosum** and its preparations are generally described as Alteratives—that is, they are medicines which alter or correct some diseased conditions of the system without producing any decided symptoms, or betraying the manner in which they act, save by removing the disease. Arsenic, in small doses, acts as a stomachic, increasing the digestive powers and stimulating the appetite, and is highly recommended by Ringer in some special forms of irritative dyspepsia and the vomiting of drunkards. It acts as a nerve tonic, exhibiting most decided antiperiodic effects, almost equal to quinia; hence its great value in ague and many forms of neuralgia and angina pectoris; and in some spasmodic disorders, as pseudo-asthmatic attacks, Ringer finds much benefit from it. It is the best remedy for chorea, any cases of failure being probably caused by too small a dose. Considerable experience shows that it is well borne in this affection, and if improvement does not follow, it should be pushed till the well-known physiological effects are observed, viz.—redness of the conjunctiva, with smarting and swelling of the eyelids, especially the lower one; signs of irritation in the membrane of the nose, throat, and mouth appear, and the digestion becomes deranged, and vomiting, griping, and purging supervene. Children 5 to 7 years old will bear in chorea as large a dose as an adult.

Hutchinson has found decided benefit from it in pemphigus; but it is in chronic scaly skin affections that the great benefit of arsenic has been so clearly demonstrated. In psoriasis, lichen, and even in chronic eczema, it often cures after all other remedies fail. Dr. Duhring first pointed out that its efficacy was greatest in diseases attacking the most superficial part of the skin, and the result of careful examination of changes observed in the skin after experiments, and the result of clinical experience, fully corroborate the accuracy of this statement.

Some very decided results have been observed to follow the administration of arsenic in phthisis; but as yet we are unable to distinguish the class of cases likely to yield to its action, and since it can do no harm it may be tried in all.

Externally, arsenic is a powerful caustic, causing the death of the tissue to which it is applied. It is chiefly in cancer and epithelioma that its use has been advocated; but it is dangerous, as enough may be absorbed to cause death. Hence, if used at all, it should be used pretty strong (about 1 dr. to

1 oz. lard), and not much surface should be operated upon at once.

☞ In poisoning with arsenic, the symptoms closely resemble English cholera, and the best antidote, after the evacuation of the contents of the stomach and the use of the pump, is light magnesia or the freshly-prepared moist peroxide of iron.

Arsenic should always be given soon after a meal, and its effects closely watched for a short time, as some are (though rarely met with) very susceptible to its action, and it is a good rule to always begin with 3 minims of Fowler's Solution ($\frac{1}{40}$ grain arsenic), which may be increased cautiously till 15 or even 20 minims are reached. Children bear large doses. A choreic child 5 years old may commence with 2 or 3 minims, gradually increased to 10 or even more. Often the red lavender contained in the liquor disgusts the stomach of the patient. It may then be ordered without it, as in the following :—

℞.

*Liq. Arsenicalis (sine Lavand.) m.* lxxx.

*Syrupi Aurantii* ℥ij.

*Aquæ Destillatæ* ℥ij. *misce.*

*Fiat mistura, capiat* ʒj *mensurâ ter in die, post cibos, ex aqua.*

**Acid. Benzoicum,** though not often used, produces very definite results. When taken in doses of 15 grs. it becomes changed in the blood, and is excreted by the kidneys, which it stimulates, and is found in the urine as hippuric acid. It thus acts as a diuretic, and, on reaching the bladder, it exercises an alterative action on its lining membrane, probably by rendering the urine less alkaline, as its good effects are best seen in cases of mild chronic cystitis with alkaline, high smelling urine generally depending upon obstructed flow. It will in like manner sometimes be found useful in intractable urethral affections, accompanied by smarting pain on micturation, and probably depending upon some irritating condition of the urine. Experiment proves that it in no way diminishes or interferes with the elimination of the uric acid. Dr. Rutherford finds it to act as a mild stimulant to the liver. Though possessed of expectorant properties, it is inferior in this respect to the gum from which it is extracted. Its use has been advocated for nocturnal incontinence of urine, and sometimes an external application of a solution of 4 grs., with an equal quantity of borax in 1 oz. water, relieves the itching of many skin affections. Quite recently benzoic acid has been found useful in controlling the amount of albumen in the urine in albuminuria. It is best ordered as a powder, to be dissolved in a tumblerful of water before swallowing, or in 5 gr. pills, made with glycerine.

**Acidum Carbolicum** is a powerful antiseptic, destroying minute forms of animal and vegetable life, and rapidly arresting fermentation, properties which go far to explain its use when given internally. It is useful in chronic gastric complaints, accompanied with offensive eructations, acting like creasote; it destroys sarcinæ, and stops fermentation on reaching the stomach, where, by its local action, it often allays sickness and vomiting when other remedies fail. Diarrhœa in a similar way is sometimes stopped by it. The sulpho-carbolates of soda, potash, and ammonia, are highly recommended for administration by Dr. Sansom.

Carbolic acid inhaled, as vapour or atomised spray, acts very effectually in checking the expectoration of chronic bronchitis, and is invaluable in gangrene of the lung. Applied as a gargle (1 dram to 1 pint) in various pharyngeal affections, or used as a lozenge, it causes anæsthesia of the mucous membrane, diminishing the reflex irritability in the palatial and other muscles, thus effectually preventing distressing attempts at swallowing, and by this means cutting short the course of acute tonsillitis, and affording much relief in follicular pharyngitis.

It is in its external application that carbolic acid has won for itself the highest name amongst surgical remedies. Applied to the skin, it acts as a painless caustic, causing the death of a very superficial film, and, in a similar way, it may be painted over exuberant granulations. The lotion (1 oz. to 1 quart) effectually destroys the foul smell of sores and ulcers, exciting in them healthy action, and hastening the healing process. Applied to fresh wounds, it diminishes the risk of profuse suppuration, and is invaluable as a dressing after amputations.

Professor Lister, believing that suppuration is to a large extent caused by the action of germs admitted with the air to wounds and cavities, and, recognising in carbolic acid the power of destroying these, filters the air through various antiseptics—chiefly carbolic acid—before it is allowed to reach the raw surface. This is the principle of the now famous "Antiseptic Method" which has partly revolutionised operative surgery. Carbolic acid, when applied to the skin, or wounds, in concentrated solution, acts as a local anæsthetic, diminishing sensibility, and if the cork of the carbolic acid bottle be laid against the skin so as to affect a small area with the acid, the hypodermic or aspirator needle can be almost painlessly inserted. It is used successfully as an application to various parasitic skin diseases, and the pure acid is the best caustic we possess for uterine ulcerations. A strong solution applied to an extensive raw surface, may be absorbed, and produce the same poisonous effects as a large internal dose, causing violent gastro-intestinal irritation, syncope, and convulsions; hence, when *extensively* employed, its effects should be watched, the urine through which it is eliminated giving the earliest indication by being turned almost black. On stopping its application no further trouble will be found.

☞ In poisoning with the acid, the stomach pump should be very cautiously used, and, though there is no known antidote, the writer, in a case where half a cupful of the strong acid was taken in a fit of drunkenness—after the contents of the stomach were evacuated—washed that organ out repeatedly with pure glycerine, using half a gallon of it, the glycerine apparently dissolving the excess of acid out of the swollen mucous membrane, and the patient made a good recovery.

The acid is best administered in the form of a pill, and, for external application, the strength of the preparation, strange to say, does not depend upon the amount of acid contained in it, but upon the nature of the solvent. 1 in 40 of water, which is the strength of the lotion used for all ordinary purposes, produces quite as much effect as "Carbolic Oil" composed of 1 part acid and 10 parts olive oil.

The following is a good form for internal administration:—

℞.

*Acidi Carbolici, m.* xxiv.

*Pulv. Glycyrrhizæ. gr.* xlviij.

*Fiat massula, et divide in pilulas* xvj.

*Capiat unam ter in die.*

**Acid. Citricum and Succus Limonis,** identical in action with Tartaric acid, are grateful refrigerants, a small quantity sucked in the parched mouth, producing a refreshing moisture by stimulating the salivary glands, and probably also all the glands of the mucous membrane down to the stomach. When administered in health, the urine becomes markedly acid under their use, but it has been found by experience that, when given in fevers, they do not increase the acidity of the urine; hence the probability of the theory of Headland that they are burned up in these diseases, acting as a fuel. Salts of the vegetable acids act as refrigerants, but they differ from the acids in increasing the alkalinity of the blood, being oxidised and converted into carbonates, in which state they pass out in the urine. Citric and tartaric acids are largely used in medicine to make effervescing draughts, which, on being swallowed whilst the carbonic acid is being given off, act as sedatives to the mucous membrane of the stomach, the gas having a soothing influence upon the terminal filaments of the nerves of this organ. Under the head of Acidum Citricum, in the Materia Medica portion of this work, will be found a useful table of the requisite proportions of different alkalies to make an effervescing mixture, and below is the formula for one of these. Lemon juice acts like citric acid, but is found to be much more efficacious in scurvy, acting in some way as a blood restorative, and, in addition to being a specific in this disease, it is a sure prophylactic. It has been recommended in acute rheumatism. There are from 32 to 34 grs. citric acid in each ounce of the fresh juice, and a solution of citric acid is largely used as a substitute.

℞.

*Potassæ Bicarbonatis* ʒv.
*Aquæ Destillatæ* ℥xij.

*Solve, capiat cochlearia duo ampla cum succi limonis recentis cochleare amplo in effervescentia.*

**Acid. Gallicum and Acid Tannicum** are powerful vegetable astringents, causing contraction of muscular fibre and condensation of tissue by precipitating the albumen and gelatine found in most living and dead structures. By this constringing power, the muscular tissue in the walls of the minute vessels is made to lessen their calibre, and the vascular supply being diminished or cut off, secretion is checked and hæmorrhages are stopped. This action, partly chemical and partly vital, explains all that results from the introduction of these acids into the stomach, for similar changes take place when they are absorbed into the blood, and are carried to the different structures containing muscular tissue, as are seen when they are applied to a living membrane under the microscope.

It is found that gallic acid is inferior to tannic as a local astringent, and that tannic when administered is changed to gallic in the blood, and as such passes into the urine, where it is recognised by blackening iron, but not precipitating gelatine; hence gallic acid is chiefly the one selected for internal administration. These acids are useful in all internal hæmorrhages, in excessive secretions from different parts of the body, and for cutting short (by constringing the vessels) local inflammations, as in various forms of sore throat, nasal catarrh, and gonorrhœa. By their action the secretion of the bowel is slightly lessened, and the contents become more solid. Glycerine of tannin will be found the most convenient preparation, and either acid may be given in 5 to 10 gr. doses, dissolved in water, or made into a pill with a little glycerine. The gall and opium ointment affords the best local astringent remedy in painful hæmorrhoids.

**Acid. Hydrochloricum, Nitricum, and Sulphuricum**—These acids form a group possessing definite therapeutical qualities, and frequently are referred to as the "Mineral" acids. They all, when applied externally, act as powerful corrosives and escharotics when undiluted, and when administered internally in their strength, they act similarly, destroying the tissue of the digestive tract, and producing the well known effects of corrosive poisons. In both these cases their action may be regarded as purely *chemical*, as they in like manner act upon dead tissues. These results are explained by their great affinity for water, which they abstract so rapidly as to cause the death of the texture containing it. Nitric acid is the one selected when we wish to avail ourselves of this property, and it is used in phagedenic ulceration and sloughing, by applying the strong acid with a stick. It destroys all unhealthy tissue, at the same time altering the condition of the surrounding living parts so that diseased action is stopped. It is likewise used to destroy warty growths, and stimulate sluggish ulcers, and it is useful when applied to the interior of the uterus in chronically inflammed conditions. Its action is very superficial.

Strong hydrochloric acid, diluted with an equal weight of honey (making a linctus), is used to destroy the false membrane in diphtheria and ulcerations of the throat.

Strong sulphuric acid is used as an application to carious bone, cancer, and chancres, and phosphoric acid acts as a powerful caustic. Diluted with from 200 to 300 times their bulk of water, they form good astringent lotions for sluggish sores, or gargles for relaxed conditions of the throat, diminishing the secretion of the part to which they are applied.

The writer has found great benefit from an injection into the bladder of nitric acid and water (as sour as the mouth can agreeably bear) in chronic cystitis, with ammoniacal urine. Dr. Roberts recommends a similar injection to dissolve phosphatic stone. Internally, the mineral acids are invaluable, and much light has been thrown upon their action by Ringer, who finds that acids check all the acid secretions of the body with which they come in contact, whilst they stimulate the alkaline ones. Thus he finds the alkaline saliva is increased, and the acid gastric juice is diminished on administering an acid. This gives us an explanation of the great value of these acids in dyspepsia. Hydrochloric acid, which is a constituent of the gastric juice, is particularly useful in chronic gastric complaints, a dose administered *before* a meal, checking the excessive irritating acid secretion, and stimulating the appetite, whilst after a meal, in a different class of cases, the digestion is accelerated by supplying the deficiency of acid and tone. In fevers the dilute acids are very extensively used, and are most decidedly beneficial; their action being supposed to counteract the excessive alkalinity of the blood, and to neutralise the acrid alkaline motions in typhoid fever. Sometimes the dilute hydrochloric acid, in 20 minim doses, may be seen to act as a mild purgative in typhus and typhoid.

The mineral acids are rapidly absorbed, having great diffusive power, and on entering the blood they combine with bases, freeing weaker acids from their salts, and thus rendering the blood less alkaline. They have an astringent effect upon the muscular tissue, and, consequently, are useful in checking hæmorrhages. The dilute or aromatic sulphuric acid in 20 minim doses, freely diluted, answers the purpose well, and also checks sweating. The free administration of the diluted mineral acids renders the urine slightly more acid than the normal condition, but these remedies do not cause the already alkaline urine to become acid in the same way that the vegetable acids do.

☞ In poisoning by the mineral acids, the stomach pump should *not* be used, owing to the injury already inflicted upon the tissues, but the alkalies should be freely given as antidotes—soda, potash, soap or lime; even plaster or mortar, if on the spot, are beneficial, and oil (almond or olive) should be then given. Stricture of the gullet after recovery is liable to occur. The writer has under his care a case where strong sulphuric acid was swallowed eight years ago by a girl, and, narrowing near the stomach, still remains, and, if dilatation be neglected for several months, the gullet shows signs of closing, though the patient, now a young woman, is in perfect health otherwise.

℞.

*Acidi Hydrochlor. Dil.* ʒiv.
*Tincturæ Aurantii* ʒiij.
*Infus. Quassiæ ad* ℥viij. *misce.*

***Fiat mistura, cujus capiat cochleare amplum ter in die ex aqua ante cibos.***

℞.

*Alum. Sulphatis* ʒi.
*Infus. Rosæ Acidi ad* ℥viij.

***Solve, sumat cochlearia duo ampla quartis horis.***

℞.

*Acidi Nitrici Dil.* ʒv.
*Syr. Aurantii floris* ℥i.
*Aquæ Camphoræ ad* ℥x. *misce.*

***Fiat mistura, cujus capiat cochleare amplum tertiis horis ex aqua.***

**Acid. Hydrocyanici Dil.**—Prussic acid is the most rapid and fatal poison known, causing death, if administered in a concentrated form, in less than a minute, by acting as a profound nervous and cardiac sedative and paralysing all the cerebro-spinal nerves. It is used in medicine chiefly on account of its sedative action when applied to the peripheral extremities of irritated and painful nerves ; hence its use in painful gastric disorders, accompanied with vomiting, 3 minim doses in gastric ulcer or cancer often giving much relief, and, by blunting the sensibility of the nerves, it is useful in the reflex vomiting of pregnancy and phthisis, and externally allaying the itch of urticaria, lichen, &c., when applied in those latter cases as a lotion of 1 in 20—care being taken that the skin is not broken.

☞ Its action is so rapid that little time is given for antidotes, of which cold affusion, inhalation of chlorine and ammonia, and injection of atropia have been recommended.

The preparations of bismuth may be ordered with great advantage with prussic acid.

℞.

*Acid. Hydrocyanici dil. m.* lx.
*Bismuthi Carb. gr.* lxxx.
*Mucilaginis recentis* ℥ij.
*Aquæ Destillatæ ad* ℥iv. *misce.*

*Fiat mist. cujus capiat cochleare minimum ter in die, ante cibos.*

**Acid. Nitric.** resembles hydrochloric acid in action, under which head it chief uses are mentioned. It is also recommended as a remedy in syphilis, but its efficacy probably depends upon its general tonic action. 1t has been supposed to exert an alterative or specific action upon the liver, but it is inferior to the following :—

**Acid. Nitro-Hydrochlor. Dil.**—In addition to the tonic properties possessed by the mineral acids, the experiments of Rutherford prove it to be an active hepatic stimulant. Professor Reid has long pointed out its great efficacy as a restorative in prostration and loss of appetite, following prolonged mental labour, in which cases, combined with a vegetable bitter, in 15 or 20 minim doses, it will be found the most satisfactory and efficient tonic we possess. Used in the form of a bath, as recommended by Sir R. Martin, in chronic congestion of the liver, by mixing 1 oz. strong nitric and 2 oz. hydrochloric acids with 2 gallons water at 98°, it will be often found useful.

**Acid. Phosphoricum Dil.** has no properties beyond those possessed by the mineral acids, as described under Acid. Hydrochloric. It is refrigerant and tonic, and is supposed by some to have the power of dissolving phosphatic deposits. It makes an agreeable drink in diabetes, without any therapeutical virtue, and should not be (as pointed out by Dr. Farquharson in his excellent manual) prescribed when we want to obtain the medicinal effects of phosphorus, since, of course, it contains no free phosphorus.

**Acid. Sulphuric.**—The astringent, tonic, and caustic properties of this remedy will be found mentioned along with the other mineral acids under the head of Acid. Hydrochloricum. It should be remembered that it is valuable as an astringent only in bleeding from mucous surfaces.

**Acid. Sulphurosum** is used in medicine on account of the powerful effect which it produces over the lower forms of life, both animal and vegetable. Hence, it is useful in parasitic skin diseases, applied, diluted with an equal bulk of glycerine; and internally in pyrosis and fermentative conditions of the stomach, depending probably upon the existence of sarcinæ. It has been occasionally vaunted as a remedy in zymotic diseases. It should be given in doses of ½ to 1 dram, freely diluted.

**Acid. Tannicum** is fully discussed under "Acid. Gallicum," which it closely resembles, being, however, much more suitable for local application, whilst the gallic acid should be the one selected for internal administration. It should be remembered that tannic acid precipitates gelatine and albumen, while gallic does not; hence the stronger styptic qualities of this acid.

**Acid. Tartaricum** is identical in therapeutic action with Acid. Citric. (which see).

**Aconite** is one of the most potent remedies in the Pharmacopœia, producing well-marked, definite effects, and causing death without affecting the cerebral faculties, by paralysing the respiratory apparatus or depressing the heart. Before this event takes place various alterations in the sensory and motor apparatus occur, about the interpretation of which great difference of opinion and difficulty exist. We know, however, that there is great depression of the entire nervous system, with diminished sensibility and loss of power (bordering upon paralysis) of all the nerves of the spine and medulla. But it is chiefly on account of its distinct sedative action on the heart that aconite is useful, moderate doses, according to Ringer, reducing the pulse to 40 beats in the minute, and lowering the respiration; and the same authority explains its action on the ground of its paralysing all nitrogenous tissue, and thus affecting the ganglia, nerves, and muscle of the heart. Following the reduction of the pulse in febrile conditions, the heat of the body falls steadily, and the skin keeps moist, aconite acting as a diaphoretic, though this diaphoretic action in no way accounts for the reduction of temperature, as Fothergill believes. These effects produced by aconite have led to its application in the treatment of inflammations—as pneumonia, peritonitis, rheumatism, and erysipelas—some authorities going so far as believing that if the remedy is administered sufficiently early, the inflammation or fever is often prevented. It seems to be especially useful in acute throat affections. It should be given in small doses—1 minim of the tincture every 15 minutes for six or eight doses, then every two or three hours, and kept up while the thermometer registers above 100°. This course, which appears to many to be merely the treatment of symptoms, should not interfere with the exhibition of remedies standing upon the solid foundations of therapeutics, which aim at destroying the cause of the disease. Aconite is found very often useful in neuralgia of the fifth nerve, and it increases the efficacy of quinia in most neuralgic conditions. Externally it paralyses the sensory nerves, causing tingling when applied to the skin or tongue, and thus it often relieves pain, especially when rubbed in, in the form of unguentum aconitiæ, over the course of the affected nerve.

It should not be administered to patients with unsound hearts.

☞ In poisoning by aconite the pump should be used, and the stomach well washed out, and stimulants *freely* administered. Various antidotes have been recommended, such as charcoal, digitalis, &c., but experience says nothing in their favour.

**Adeps and Adeps Benzoatus** are used solely as external emollient applications, affording a uniformly soft and unirritating base for the preparation of ointments containing more active substances. The benzoin is added to resist the putrefactive changes to which lard is so liable.

**Æther** is used in medicine with three different intentions—1. As a local anæsthetic, when it is thrown in the form of spray upon the skin or gum, when the reduction of temperature caused by its rapid evaporation becomes so great as to freeze the part, depriving it of all sensibility, and permitting the performance of minor cutting operations or the extraction of teeth. The ether used for this purpose is the absolute, or anhydrous. 2. It is administered internally in moderate doses, when it acts as a powerful diffusible stimulant and narcotic, like alcohol; and it is consumed largely in some parts of Ireland as a substitute for whiskey; it is antispasmodic, and is useful in bronchitic asthma, in doses of ½ to 1 dram. Durande's remedy for the solution of gall-stones was a mixture of turpentine and ether. 3. It is inhaled to produce general anæsthesia, and acts like chloroform, only it is undoubtedly safer, having a stimulating action on the heart; when death occurs, which is very rare, it is owing to the paralysis of the respiratory apparatus. It is, on the other hand, more disagreeable and more tedious, and supposed by some to be more liable to be followed by vomiting, disadvantages which, when balanced against greater safety to life, should weigh as nothing.

It may be given, poured upon a sponge in any form of inhaler which fits the face, 1 oz. being poured on at first, and kept up fearlessly till symptoms of insensibility show themselves. If the sponge be warmed, by wringing thoroughly out of hot water, the effect is sooner produced. Some patients require a good deal, and the writer has used a pint and a half in one instance before insensibility supervened. (See Chloroform.)

**Æther Acetic.** resembles ether in action, only is more agreeable and milder, and acts as a mild diaphoretic in doses of half a teaspoonful in sweetened water or sherry.

**Æther Nitrous**—as found in Spirit. Æther. Nitrosi—though regarded by many as a domestic remedy, is a very efficient and agreeable diaphoretic and diuretic, especially useful in dropsies in the debilitated. It possesses powerful narcotic properties, like ether, when given in large doses. Dr. Walter Smith thinks its diuretic action probably depends upon its stimulating action on the heart. It is invaluable in all febrile affections of childhood characterised by a hot skin; and in full doses, 12 or 15 minims for a child one year old, it soothes the irritation of delayed dentition better than any other safe remedy.

**Albumen Ovi**—The liquid white of the egg—consists of about 14 parts coagulable albumen, 3 of mucus, and 83 of water, with traces of salts, and it is highly nutritious, supplying to the blood an element which is found in most tissues. After digestion, which changes it to a crystalloid albumen, it is again altered in the liver. It is introduced into the Pharmacopœia as a test for metaphosphoric acid in Acid. Phosph. dil., and it is used to coat pills and make emulsions.

☞ It is used as an antidote in poisoning by mineral salts, as mercury and copper, as it forms insoluble compounds with these.

**Alcohol Amylicum**—Fousel oil—is not used in medicine. It has been often employed by the poorer classes as a counter-irritant. It is introduced in the preparation of valerianate of soda.

**Aloe Barbadensis and Aloe Socotrina** are cathartic, chiefly acting upon the large intestine, especially its lower half, producing—in doses of 1 to 4 grs., after about 10 hours—copious softened evacuations, generally accompanied by some griping. It produces its effects when sprinkled over a blistered surface, or injected into the blood, so that it probably, as Headland thought, when administered internally, enters the blood, from which it is eliminated by the mucous membrane of the colon, which it stimulates to increased action. It has a decided stimulating effect upon the liver, and increases the quantity of bile, as Rutherford's experiments prove, at the same time acting upon the duodenum. Very large doses cause watery motions by increasing the intestinal secretion. Very small doses, as ⅛ to ¼ gr., increase the appetite, and give tone to the stomach. The effect of this drug depends more upon the state of the bowels than upon its dose. 2 or 3 grs. will be found enough for ordinary results, and, if followed in six hours by a mild saline, will prove a very effective cathartic. It is in chronic constipation that aloes is most used, and ½ grain in a dinner pill, or ⅓ grain with nux vomica and iron twice a day will give good results. It is of great value in amenorrhœa, being supposed to excite the uterus from its proximity to the seat of action—the rectum—but for this purpose it should be ordered with iron about the expected time of the delayed menstrual appearance. Often it relieves, but sometimes aggravates hæmorrhoids, and should not be given in pregnancy. The watery extract of Socotrine aloes is the best form for administration, and it is of it that the above doses are given, and its effects are increased by the addition of a bitter. The Compound Decoction of Aloes was observed to give good results in many intestinal complaints by Professor Gordon, and the writer has found surprising effects from it in obstinate diarrhœa in children and adults ; cases having been observed to resist all treatments, both astringent and eliminatory, have yielded to a few 1 to 2 oz. doses of this preparation, which seems to possess some alterative action on the mucous membrane, often causing in 6 hours a solid soft motion where watery evacuations have been the rule for many days. It is, however, a most unreliable purgative—1 oz. occasionally purging at one time and constipating the next.

℞.

*Extracti Aloes Socot. gr.* ⅓.
*Extracti Nucis Vom. gr.* ½.
*Ferri Sulphatis. gr.* iiss.
*Pulv. Gentianæ gr.* ij. *misce.*

*Fiat pil. mitte tales* xxiv. *st* i. *mane nocteque.*

**Alum.** is an astringent, causing muscular fibre to contract and coagulating albumen. Externally it is powerfully styptic, and the *dried* powder is an escharotic, destroying granulations and warty growths. When administered it is carried by the blood, after absorption, astringing the tissues and vessels and diminishing secretion. In this way it controls distant hæmorrhages, and is the best remedy in the bleeding of the bowel in typhoid fever. In 10 gr. doses it may be given to check the profuse secretion in bronchitis, dysentery, diarrhœa, leucorrhœa, and night-sweats. In large repeated doses (of 1 dram) it is emetic, and combined with opium, it purges gently in painters' colic, and it has been vaunted as one of the myriad specifics for pertussis. The most satisfactory effects of alum are seen in its local astringent action; 4 to 8 grs. in 1 oz. water almost always cure the purulent ophthalmia of infants, when poured into the eye every hour, unless it is of gonorrhœal origin; ½ oz. to 20 makes a valuable gargle for relaxed throat, a lotion for secreting wounds, and an injection in gonorrhœa and leucorrhœa. It has been found beneficial in whooping-cough, and inhalation of the powder is useful in chronic catarrh and nasal discharge.

**Ammoniacum**—A stimulating expectorant, which has fallen into disuse, but which will be always found beneficial in assisting the aged and emphysematous in getting up with greater ease the tough, viscid secretion of the chronically inflamed mucous membrane. Probably it acts by some of its constituents being excreted by the membrane, depriving the secretion of its adhesiveness. Considerable experience of its effects in a large infirmary of *aged* invalids convinces the writer that in some way it greatly facilitates expectoration, and assists wheezing, in doses of 10 grs. to ½ dr., rubbed into an emulsion with warm water. Larger doses act as a purgative; and externally it is a mild irritant, the plaster often bringing out an eruption on the skin.

**Ammonia**, when applied externally, is a rubefacient or vesicant. A small blister may be produced in a few minutes by laying a piece of lint, soaked in the strong solution, on the skin, and rapidly covering it with a watch-glass. Its vapour, applied to the conjunctiva and respiratory tract, also acts as a powerful irritant and stimulant, and is useful in syncope and conditions arising from shock. Internally, free ammonia, or its carbonate, acts as a powerful, diffusible stimulant, directly exciting the heart, and adding temporary tone to the circulatory and nervous systems; hence, in cases of sudden depression and desperate exhaustion, a dram of the dilute liquid, mixed with twice its bulk of water, should be injected into one of the veins. Its action being the same when thrown into a vein or swallowed, shows it is not likely that it is neutralised before absorption (perhaps owing to its high diffusive power), and it probably acts directly on the cardiac nerves, and afterwards on the entire nervous system, and is partly eliminated by the bronchial mucous membrane, which explains its expectorant action by thinning the viscid secretion. It is also alkaline or antacid, neutralising in the stomach any excessive quantity of acid or irritating gastric juice. It should be injected where there is strong reason for supposing that a clot of blood has formed in the heart or any of the great vessels, as it aids its solution.

*Carbonate of Ammonia* acts like the free gas. It is emetic and purgative in large doses; and in quantities of about 8 grs., diluted freely, acts as a most efficient stimulating expectorant and general diffusible stimulant in all prostrating febrile conditions, its administration in measles and scarlatina being followed by most satisfactory results, even reducing the temperature. It is just possible it acts by destroying the morbid poison in these cases, as it does in wasp stings and insect bites when applied locally. It is not admissible in typhoid states with ammoniacal breath. The utility of its injection in snake bites is doubtful.

*Acetate of Ammonia Solution*, or spirit of Mindererus, acts, after absorption, upon the skin, causing profuse diaphoresis, and is especially useful in all the feverish conditions of childhood. It possesses the curious power of counteracting the immediate effects of drunkenness, but must be given in wineglassful doses, or, in emergency, a teaspoonful of the carbonate in a glass of vinegar acts equally well.

A mixture containing 2 oz. of acetate of ammonia solution, 2 drs. of acetate of potash, 4 drs. of spirit of nitre and camphor water, with a little syrup, to 8 oz., affords the most satisfactory and harmless diaphoretic, or anti-febrile combination, in passing febrile conditions, or while awaiting a definite diagnosis in the more serious feverish states. The solution of the citrate has the same action.

*Benzoate of Ammonia* is a diuretic, acting like benzoic acid, and, like it, passing out as hippuric acid in the urine. It is more active than the acid. Dose—10 to 20 grs., in water.

*Bromide of Ammonium* resembles the corresponding potash salt in action. (See under Bromum.) It is, however, much more useful in whooping-cough, adding to its antispasmodic a decided expectorant action, and possessing sedative influence over the mucous membrane of the pharynx and larynx. The writer has found it in hospital practice the best routine remedy for this disorder in children, combined with expectorants, like hippo and squill. It must, however, be given freely; a child one year old may get 3 grs., or in bad cases it may be pushed till drowsiness and marked sedative effects are produced. Da Costa urges its use in acute rheumatism.

*Chloride of Ammonium* is a useful expectorant when taken internally, and is most valuable when sucked in the mouth in small pieces, or, more elegantly, in the compressed discs of Wyeth, one of which, placed in the hollow above the last upper molar, between the cheek and the gum, where it will take above an hour sometimes to dissolve, will be followed by a free, painless, and often silent expectoration of mucus and checking of the cough. It often permits the subjects of bronchial irritation to fearlessly expose themselves to the cold, damp, and even foggy atmosphere of a severe winter. The action, as already explained, is reflex, and this salt of ammonium gives the best results of any of the series of ciliary excitants, far exceeding in effect its action when swallowed in large doses. (See under Acacia.) Chloride of ammonium was found by Anstie to be useful in neuralgia, and to cut short the course of a migraine attack, in doses of 20 grains. Murchison largely employed it in chronic hepatic congestion.

*Phosphate of Ammonia* is a diuretic, and is said to decompose the insoluble urate of soda in the blood, forming urate of ammonia and phosphate of soda, and is highly recommended in cases of uric acid calculus.

*Spirit of Ammonia (Aromatic)* and *Aqua Ammoniæ* afford, the former especially, agreeable methods of administering ammonia. It is, perhaps, needless to say they should be always freely diluted.

☞ Ammonia acts as a caustic or irritant poison when swallowed, the free gas causing serious laryngeal trouble, possibly requiring tracheotomy, and violent gastric irritation, forbidding the use of the stomach-pump. Diluted acids should be freely given, especially acetic, followed by almond or olive oil.

℞.

*Spt. Ammoniæ Aromat.* ʒv.

*Tinct. Card. Co.* ℥j.

*Aquæ Destill. ad.* ℥viij. *misce.*

*Fiat mist. cpt. coch.* i., *amp. ex aq. tertiis horis.*

**Amygdala**—The sweet almond—is sometimes used in medicine on account of its mild, demulcent effect when directly applied to irritated mucous membranes, but it is, however, chiefly employed as an agreeable vehicle for more potent remedies, or made into bread as a food for diabetics. The oil *expressed* from either variety is a bland, soothing application in inflammatory skin affections.

Bitter Almonds are more active, containing, in addition to emulsin, which is also found in the sweet variety, a principle called amygdalin. These two substances, when brought together in presence of water, act upon each other, the amygdalin splitting into two new bodies—prussic acid and volatile oil of almonds—the former of which, being a deadly poison, accounts for deaths after eating bitter almonds; and it explains the action of a lotion of bitter almond emulsion in stopping the itch of various skin affections.

**Amyl Nitris**—When 2 to 5 minims of this drug are inhaled a surprisingly rapid effect is produced upon the heart and arteries; the pulse is quickened, or sometimes doubled, the arteries greatly dilate, the carotids throb, and the face flushes, and there is great general relaxation of the arterioles, with diminished blood pressure. The result of observation shows that nitrite of amyl produces this great vascular dilatation, either

1. By paralysing the sympathetic system;
2. By paralysing the vaso-motor centre; or,
3. By its direct action on the muscular tissue of the arterioles.

The evidence of recent experiments is strongly in favour of this latter supposition. Dr. Brunton, who first studied the action of the drug, anticipated its efficacy in Angina Pectoris, in which disease it has proved a blessing, lessening, when a few drops are inhaled, the arterial spasm, and in the great majority of cases producing complete freedom from the agony of the attack. It does not act so certainly or rapidly when swallowed, and the ordinary way of pouring 3 to 6 drops on a handkerchief, or on the palm of the hand, and inhaling the vapour, is the best; sometimes smelling a bottle containing it answers the purpose. The dose is the same whether inhaled or swallowed. It has been used with success in epilepsy while the attack is coming on, in asthma, neuralgia, and eclampsia.

**Amylum**—Starch—is nutritious; but it is for its bland, unirritating qualities, when applied externally or in enema, that it has been used in medicine. The powder dusted over erysipelatous or excoriated surfaces acts as a soothing coating, shielding the part from the action of the air or irritating secretions. Occasionally the preparation with glycerine irritates the skin.

☞ Starch is the antidote for iodine.

**Anethum and Anisum**—Dill, Aniseed, Coriander, Fennel, and Caraway are identical in action. They are in large doses general stimulants, and are used in medicine as remedies to relieve the griping of purgatives, and the pain of colic and flatus in children, for which purpose aniseed is most used. They probably act in these latter cases as antispasmodics by reflex action; in small doses they increase the secretion of gastric juice, and all possess feeble expectorant powers by stimulating the respiratory membrane during elimination by the breath. In full doses aniseed has weak narcotic powers.

**Anthemidis Flores**—Chamomile—is a stomachic bitter, improving the appetite, and indirectly aiding digestion by increasing the vascularity of the gastric mucous membrane; in larger doses, especially if warm, the infusion is emetic. Its chief use is in atonic dyspepsia. Externally, a warm fomentation is a popular remedy in the early stage of inflammations and sprains. The oil is a general stimulant and antispasmodic in 5 minim doses. It diminishes reflex excitability.

**Antimonium**—The tartrate is the salt generally used in medicine on account of its greater solubility and activity.

Externally, it reddens the skin, and brings out an eruption somewhat like smallpox. Owing to its counter-irritant action being uncertain, and liable to be followed by scars, it is not much used.

In large doses it is a violent irritant poison, producing inflammation of the digestive tract, with great prostration, and total paralysis of the motor and sensory nerves from its action on the cord, acting, as Ringer believes, as a protoplasmic poison, destroying the function of all nitrogenous tissue.

In medicinal doses its action varies with the quantity administered; $\frac{1}{12}$ to $\frac{1}{6}$ gr. acts as an alterative. Without giving rise to any symptoms peculiar to itself, it changes or alters mysteriously the action of disease, as may be seen in some chronic inflammations of a local character, as in ophthalmia. In $\frac{1}{6}$ gr. doses it acts as a diaphoretic, causing free perspiration, probably by affecting the nerve supply of the sweat glands, by which it is slightly eliminated, and it increases the secretion of the bronchial mucus. This latter effect is one of the most important of the drug, and places it in the first rank of true expectorants. It would appear that the same change occurs in the mucous membrane, as is seen in the skin, and this is especially likely, as we know that the gastric and intestinal mucous secretions are likewise increased. In slightly larger doses—$\frac{1}{4}$ to $\frac{1}{2}$ gr.—nausea is excited, and the heart's action is diminished, antimony acting as a cardiac sedative; the pulse gets soft and weak, arterial tension is lowered, and generrelaxation of all muscular structures supervenes; and if the dose is repeated, or one dose of 1 to 3 grs. be given, active vomiting takes place, with great depression and intensification of the former mentioned effects, and the respiration is slower.

Its emetic action follows either after it is swallowed or injected into a vein, and experiment shows that it acts in each case by irritating the terminal filaments of the pneumogastric and exciting reflex action, or it may possibly act on the nerve centre, or on both. Such, then, is the *physiological* action of tartar emetic—that is, its action when administered to a healthy organism; its *therapeutic action*, or the effects which it produces in diseased conditions, can be for the most part anticipated from this. Thus, in febrile conditions, with a hot, dry skin, its diaphoretic action will be called to our aid; in bronchial affections with tenacious adhesive secretion it produces great benefit; while in acute inflammations like pneumonia and pleuritis, with high bounding pulse, great fever, and vascular excitement, it is simply invaluable, from its cardiac sedative action. In acute inflammatory affections of the respiratory tract, especially in croup and laryngeal spasmodic diseases, it is our sheet-anchor, allaying spasm, reducing fever, and directly cutting short the progress of the disease. It is called an antiphlogistic from this power of combating acute inflammations of a sthenic type, and it is probable that its action in such cases is only what can be accounted for by its effects upon the heart's force and frequency, and the diminution in the respiratory movements and vascular tension.

In the violent delirium of fevers, Graves employed it in ¼ gr. doses with great benefit, combined with as much opium, every hour or two. In delirium tremens, when opium failed totally to produce any sleep, the writer has seen it speedily act when ¼ to ½ gr. of this salt was added.

In the acute bronchial affections of childhood, antimony continues to be the best remedy we possess. Combined with hippo, or given alone, in the form of the wine, ½ to 1 teaspoonful is an emetic for a child 1 year old, and 3 minims every hour afterwards keep up the expectorant effect; but the dose can be easily regulated by keeping the little patient on the border-land of vomiting. In bad cases this treatment cannot be persisted in, as great prostration supervenes.

Tartar emetic was formerly employed to produce muscular relaxation in dislocations and hernia, a practice which has melted away before the advance of chloroform. It is still used in rigidity of the os, and is valuable in acute synovitis. Often eat tolerance of the drug may be observed, probably, as writer suggests, owing to the toxic effect of the poison (causing the fever) on the nerve centres. (For the other prepreparations of Antimony, see below).

☞ In poisoning, after washing out the stomach, *tannin* should be freely given; in the absence of it, or any drugs containing it, strong green tea is beneficial, followed by mild stimulation.

*Antimonial or James' Powder*, the active principle of which is oxide of antimony, possesses most of the properties of the tartrate in a feeble degree. It is used in 5 gr. doses in febrile conditions, for its mild and pretty certain diaphoretic qualities.

*Chloride of Antimony* is a powerful caustic and corrosive liquid, only used externally.

*Sulphurated Antimony* possesses all the powers of the tartrate, only in a less degree. It has alterative properties, which have gained for it some reputation in syphilis, when given with calomel in Plummer's pill. It is most uncertain in action on account of its insolubility.

**Aqua**—The effects of water as a remedy depend entirely upon the form of its exhibition, and this is so varied that only a very few of its actions can be noticed here.

Internally, water is of great use in fever, in the form of ice, a bit of which sucked in the mouth allays thirst by reflex action, acting like the ciliary excitants, and bringing up thick mucus, so common in fevers. It also, probably by reflex action, increases the quantity of gastric juice before being swallowed. In ulcer, and irritable conditions of the stomach, it soothes by diminishing sensation, while it checks hæmorrhage by contracting the muscular tissue of the ulcerated artery.

In ½ to 1 pint doses, cold water before food in the morning acts as a mild cathartic, by adding water to the fæces, which it probably does by being alternately absorbed, and eliminated again as it passes down the canal, stimulating the intestinal glands. Introduced into the rectum as an enema, water washes out the colon, and is the safest remedy in impacted accumulations; but, to be administered properly, it should be given by itself at about 98°, slowly injected, with the patient lying on the left side. From 3 to 10 pints can be used with safety, if not jerked up; and immense benefit will be found by turning the patient over gently on his right side, or on his hands and knees, or by raising the pelvis, so that the fluid gravitates along the colon to the valve; and the writer thinks that he once was able to pass the fluid through the valve by external manipulation. During the administration of an enema of this kind the operator should frequently pause till the spasm of the bowel passes off, when he r begin again, till all the water that can be comfortably borne is injected, and the bowel will speedily dispel it along with its contents. Of a different class are enemata of cold water, or of water containing castor oil, turpentine, soap, &c. Here the intention is to excite reflex contraction, which one endeavours to avoid in the former case, and a pint or two will be enough. Still more different are nutrient enemata, which are intended to be absorbed. They should not be more than the bulk of a few ounces, and should be of the consistence of thin arrowroot. The addition of a little laudanum assists in their retention till digestion and absorption occur. Water, when taken in large quantity, acts as a diuretic, by washing out the kidneys and bladder.

Externally, water is largely used in medicine, and its mode of action depends upon its temperature and the method of application. Bartholow states that on immersing one hand in cold water a corresponding reduction of temperature occurs in the other hand, and infers that changes in a similar way occur internally.

The impression on the sensory nerves caused by entering a bath of cold water is conducted to the respiratory centre, from which stimuli issue, setting in motion complicated respiratory and other movements, and, after a time, refrigeration occurs from the actual loss of animal heat, water acting as a good conductor; the vessels of the skin are caused to contract, and in the warm bath they relax. The hot bath at first acts as a powerful stimulant, but, if indulged in for too long a period, the heat of the body causes cardiac weakness, and prostration and fainting follow. The hot and warm baths, acting so thoroughly on the skin and increasing its secretion, are used to cause excretion of water and urea in dropsies.

Ice is largely used in surgical practice as an application to inflamed parts, as in orchitis, hernia, head affections, &c., acting as a sedative, diminishing the amount of blood in the part, both by direct and reflex action; and water, iced, tepid, and cold, is used for dressing and irrigating wounds.

The following are the most common forms in which water is used externally as a remedial measure:—

The *Cold Bath*, which is water about the temperature of the air, or on an average of between 45° and 60° F., is used in fevers, and as a tonic in various diseases of the nervous system.

The *Tepid Bath* is water about 85° to 95°, also used in fevers.

The *Warm Bath* is water at about 98° or 100°, and the *hot* bath is water at 103° to 110°, used in dropsies, kidney disease, catarrh, &c., while in the *Turkish bath* various apartments are heated from 100° to 200° F. It is used in secondary syphilis, rheumatism, &c.

The *Sitz* resembles the *hip bath*, being a vessel in which the pelvis and hips can be immersed in water at any temperature, the remainder of the body being free. It is used in the sitting posture, chiefly by females, for uterine ailments, amenorrhœa, &c.

The *Sponge Bath* is a shallow vessel, generally of cold water, in which the patient sits or stands while the surface of the body is sponged freely over. In its effects it is identical with the cold bath.

The *Douche* is a sudden application with force of a stream of water (generally cold) to the surface of the body; an invaluable remedy in the coma of alcohol, sunstroke, &c. It differs from the *shower bath*, which is the impaction of a multitude of drops, or minute streams, from a height, and from *cold affusion*, which is the pouring of a liberal volume of cold water over the surface of the body, as in fevers, alcoholism, and laryngismus.

The *Wet-Pack*, so much used in hydropathy, consists in enveloping the body in a linen sheet rung out of cold water, and spread flat upon a hard mattress, upon which the patient reclines, the ends of the sheet being carefully tucked in on each side, and the feet completely covered, after which several blankets are placed upon the top of the sheet. The pack lasts half an hour or more, and friction with dry towels finishes it.

The *Hot Wet-Pack* is managed in a similar way with hot water, and resembles the various *steam* baths used in dropsies, and which may be made by boiling water under a cane-bottomed chair, upon which the patient sits, surrounded completely, except the head, by a blanket.

Sir J. Simpson's poor man's bath is made by filling 6 or 8 soda water bottles with hot water, drawing over each a stocking squeezed out of hot water, and placing them alongside the patient under the bed-clothes. They make a splendid bath in about 30 minutes.

The *Hot-air Bath* is made in a similar manner by burning a spirit lamp under a chair, or by introducing under the bed-clothes any of the spirit lamps made for the purpose. These latter are invaluable in Bright's disease.

*Fomentations* are merely local baths, or circumscribed hot packs, in which generally medicinal substances are introduced.

*Cataplasms* are similar applications of a semi-solid consistence, composed of various medicated ingredients.

It is in the treatment of hyperpyrexia where the temperature of the body rises to 106° or 108° and remains so, death being almost certain in such cases if let alone, that the judicious application of cold water saves life—as in typhus, and rheumatic fever especially. The patient is placed in a bath of about 98°, and cold water or ice is added till the bath cools to 70°, 60°, or even 50° F., watching the temperature of the patient, as indicated in the rectum. When a fall of 3 to 5, or more degrees, occurs, he is removed, wiped dry, and put to bed, where the temperature continues to fall for half an hour or more. The time in the bath varies from 5 minutes to 2 hours, and it may be repeated every four hours (if necessary) when the case is severe. Many Continental physicians treat most cases of fever in this way. Water at a temperature of about 112° effectually checks uterine hæmorrhage when injected into that organ.

Aquapuncture, or the injection of water by the ordinary hypodermic needle under the skin, or into the substance of muscles, is often followed by surprising results. Its action depends upon its nutritive effect on the nerves of the part, for pain in a superficial nerve is generally at once alleviated, and it will often produce this effect without causing any irritation round the puncture. Bartholow has derived good results from the injection of water into the substance of paralysed muscles.

For superficial pain 30 minims should be injected at the pained spot and frequently repeated—5 times within an hour if necessary.

**Areca Nut** when swallowed in doses of ½ oz. in powder acts as a poison to the tape-worm ; in smaller doses it acts like catechu, as an astringent ; and is used in diarrhœa and dysentery. In a powder or in paste it is used as a local astringent in dentifrices.

**Argenti Nitras** is a powerful corrosive poison, and when applied externally it destroys the tissues, and is used to paint over exuberant granulations, its destructive effects being followed soon by an *altered action* of the parts, a result which is utilised in many chronic unhealthy inflammations, as in gonorrhœa (2 grs. to 1 oz.), conjunctivitis (10 grs. to 1 oz.), ulcers (30 grs. to 1 oz.), and relaxed pharyngeal cases (20 grs. to 1 oz). It destroys warts and chancres, and effectually kills the poisons of rabid animals and snakes, if applied in time.

Internally it has been successfully used in large doses (2 grs.) in ulcer of the stomach, with the view to cauterise or alter the character of the process going on in and around the ulcer, its use being not free from danger. It coagulates albumen, possesses astringent qualities, and hence is used in diarrhœa depending upon ulceration ; and its effects upon the gastric nerves, in doses of ¼ gr., in bread-crumb pills, are sedative. It prevents spasm, and is useful in epilepsy; but, owing to the discolouration of the skin following its prolonged use, it is seldom employed. When it reaches the stomach it is precipitated by the chlorides abounding in the gastric juice, and likewise when applied to a moist surface it whitens it, owing to a film of the chloride being formed, which is afterwards changed into the black oxide.

☞ *Antidote.*—Common salt freely administered, and followed, if necessary, by emetics.

℞.

*Argenti Nitratis gr.* v.

*Micæ Panis gr.* xxx. *misce.*

*Fiat massula et divide in pilulas* xvi., *st.* i. *ter in die, ante cibos.*

**Argenti Oxidum** resembles closely the nitrate, except in its external effects. It is less irritating, and has been used in 1 gr. doses, for its astringent properties, in hæmorrhages, especially menorrhagia.

**Armoracia**—Horse-radish Root—when chewed, acts as a stimulant to the salivary glands, increasing their secretion—hence it is a Sialagogue. When swallowed, it increases the gastric secretion, acting as a stomachic, and after absorption it is thrown out by the kidneys, stimulating these organs in its passage—thus it is a true Diuretic. The secretion of the skin is also increased. When applied externally it is a Rubefacient, causing redness, like mustard, only less in degree.

**Arnica**—Externally applied; preparations of the root or flowers cause irritation of the skin, which may take on an erysipelatous action. Diluted, these preparations are said to act in such a way as to cause rapid absorption of extravasated blood, possibly by their effect on the absorbents of the skin; hence they are regarded as of great value when applied to sprains and bruises. Internally, arnica has been credited with many fancied virtues. It is, however, pretty certain that it acts as an irritant to the stomach and gullet, and produces diarrhœa, and in large doses diminishes, somewhat like aconite, the respiratory and circulatory functions; hence it has been regarded as a useful remedy in fevers; and Bartholow believes the tincture is exceptionally valuable in delirium tremens. It produces in poisonous doses marked nervous prostration.

**Arsenic.** (See Acid. Arseniosum.)

**Assafœtida,** after absorption, acts as a stimulating expectorant, closely resembling the onion in its power of increasing the secretion of mucus from the air passages, probably during its excretion by this channel; and it either blunts the sensibility of the respiratory centre, diminishing the breathlessness of the emphysematous, or, by diminishing the flatus in the digestive tube, it gives more room to the easily over-burdened lungs. It is, however, in hysterical ailments that it is chiefly employed, controlling the irregular and erratic nervous phenomena seen in that disease, as some suppose, by the moral influence of its disgusting and intolerable odour.

Increasing the intestinal secretion as it does the respiratory, it acts as a mild purgative, and is very beneficial as an enema in flatulent colic. The best preparation is the Fetid Spirit of Ammonia, in ½ dr. doses.

**Atropia**—Chiefly used as a dilator of the pupil, and a powerful anodyne to the excoriated nerve endings exposed in ulcerative ophthalmia. It weakens the nervous supply (third cerebral) of the sphincter muscle of the iris, which is then dilated by the stimulated sympathetic acting on the radiating fibres. In all its actions it resembles belladonna, of which it is the active principle (and which see). There are two liquid preparations (4 grs. to 1 oz.) for local application to the eye. The Liquor Atropiæ Sulphatis is the best; it causes no smarting; $\frac{1}{60}$ gr. may be injected hypodermically.

**Aurantii Cortex** is a mild, bitter tonic, acting on the stomach in such a way as to give it increased tone, and it feebly stimulates the appetite. It is for its flavour (which is aromatic and pleasant) that it is used in medicine.

**Aurantii Flores** are only used for their agreeable perfume and flavour, though some suppose them to possess hypnotic properties.

**Balsams of Peru and Tolu**—These substances are of little therapeutic power; they act as stimulating expectorants, probably because they are eliminated to some extent by the bronchial mucous membrane, and, to a still less extent, by the other mucous surfaces, to which they act as feeble stimulants. Externally, the Peruvian balsam is a mild stimulating application to sluggish ulcers, bed sores, and cracked nipples, in which cases it is often mixed with castor oil in equal quantity.

**Baths.**—(See under Aqua.)

**Beberiæ Sulphas** possesses unstimulating tonic properties; it was introduced as a febrifuge, and has, undoubtedly, eriodic powers, but so inferior to quinia and iodine that it is now seldom employed, and the bark (nectandra) from which it is extracted shares the same disrepute. It possesses astringent properties, and never appears to affect the stomach as quinia does.

**Belæ Fructus**—There is much diversity of opinion about the *astringent* action of this drug, which is so highly prized in India for dysentery and diarrhœa, some asserting that it is devoid of tannin. The discrepancy probably arises from the fact that the tannin disappears early in the development of the fruit, and if not collected before or just as it becomes half-ripe the tannin disappears. It is possible that the fruit on drying and keeping, undergoes changes which account for its different actions here and abroad. The pulp of the ripe fruit is slightly purgative.

**Belladonna**—As the result of experiments on animals, and observation in accidental poisoning in man, the action of this drug on the healthy organism has been studied at considerable length. A large dose produces active brain excitement, with pleasing delirium, hallucinations, illusions, and eventually sleep. The heart becomes excited and the vascular system stimulated, sometimes with enormous energy (standing 12 feet from a patient the writer has heard the heart sounds); the small vessels contract, and the arterial tension is raised, the secretion of saliva and sweat is stopped, and the mouth and skin become parched, often a cutaneous rash appearing; the bladder is partially paralysed, and the urine and urea increased, and the pupil is widely dilated. There is still much difference of opinion as to how these effects are produced; the balance of evidence is in favour of the conclusion arrived at by Dr. Harley, "*that belladonna is a powerful and direct stimulant to the sympathetic system*," and thus the action on the heart and pupil is explained; but many excellent authorities believe that it only paralyses the inhibitory pneumogastric nerve, handing the heart over entirely to the control of the sympathetic, which is not stimulated. In the same way its action on the pupil is debated, some believing that it paralyses the filaments of the third nerve, permitting the radiating muscular fibres under sympathetic influence to have unopposed control; whilst others believe the third nerve is unaffected, the sympathetic being powerfully stimulated. The result of further light will probably show that both theories are partially correct. What we now know of nerve force and its manifestations might lead us to infer that the withdrawal of an inhibitory action would directly act as a powerful stimulant to the opposed nerve, which would thus exert greater exciting power than it ever displayed while opposed; hence it is possible, in the case of the heart and pupil, that belladonna *weakens* the action of the vagus and third nerves, thereby stimulating the sympathetic.

Quite recently, however, Wharton Jones has directed attention to the elastic element in the iris, which prevents its wide dilatation when the motor occuli is paralysed; and he brings strong evidence to show that dilatation is caused by the powerful stimulation of the sympathetic supplying the dilator muscle. These physiological effects of belladonna show us how useful the drug may be in diseased conditions. Thus, when other remedies fail, it may give sleep, and may be used to give tone and power to a weak heart.

Dr. Brown-Séquard recommends it with the intention of contracting the small vessels supplying diseased tracts of the nervous system, as in certain forms of spinal paralysis, and for a similar reason it has been employed in various inflammations. From its power of stopping the secretion of the mamma and skin, it is invaluable in checking sweating and preventing inflammation of the breast, in both of which cases it may be administered internally and applied externally. It increases the action of purgatives, as some suppose, by weakening the circular muscular fibres, and thereby stimulating the longitudinal ones. It is recommended on this account in obstruction of the bowels, impacted gall-stones, renal calculi, and asthma. Harley recommends it in kidney affections, where he pointed out its great usefulness in soothing the irritation of active congestion and directly diminishing the congestion by contracting the small vessels.

As a diuretic it especially increases the urea in diseases threatening suppression of urine. From its anodyne action it is beneficial in neuralgia, and Anstie advocated its use by hypodermic injection in lumbago, sciatica, and neuralgia of the pelvic organs. Pushed almost to the extent of showing its poisonous effects, it is curative in whooping-cough, and children bear very large doses. It is by far the best remedy in incontinence of urine in children, probably by its partially paralysing the muscular coat of the bladder. It is excreted by the urine.

Externally, it is used on account of its anodyne properties to relieve pain in neuralgia or to arrest the suppurative process in boils; and the plaster, in addition to relieving pain, acts by putting the place to which it is applied to some degree on the same footing as an *internal* part; hence its value as a strapping in enlarged glands and superficial joint affections. The extract often acts like a charm to piles, when diluted freely and applied.

☞ *Antidote.*—In poisoning, opium is to some extent antagonistic, and may be freely given after the use of the stomach pump. The hypodermic injection of morphia is the best form for the administration of opium in these cases.

*(For incontinence of urine in a child 2 years old.)*

℞.

*Tr. Belladonnæ* ʒiv.
*Syr. Aurantii flor.* ʒiv.
*Aquæ ad* ℥iv. *misce.*

*Fiat mist. cujus capiat cochlear.* i. *min., bis in die, et hora somni.*

*(For inflamed mamma, threatening suppuration.)*

℞.

*Ext. Belladonnæ* ℥j.
*Glycerin., q.s. ut.*

*Fiat applicat. Signa, "A little to be spread upon lint and applied to the inflamed breast, and covered with oiled silk."*

**Benzoinum**—A stimulating expectorant, acting, probably, on the relaxed bronchial mucous membrane, by which some of its volatile constituents are eliminated. It possesses all the properties of its active principle, Acid. Benzoic. (which see). The compound tincture, or friar's balsam, is an invaluable stimulating application to ulcers and sores, and is the best remedy for healing tortuous sinuses and sinuous scrofulous tracts, and injected (undiluted) with a fine syringe, it decomposes fetid secretions, and establishes healthy action in these troublesome affections. It is a valuable hæmostatic when applied to fresh wounds.

**Bismuthum**—The preparations of bismuth act, when swallowed, as direct sedatives, by coming in contact with the excoriated or irritated filaments of the nerves supplied to the mucous membrane of the stomach. They are not absorbed, except in most minute quantity, but pass out by the fæces, which they blacken. However, though not capable of being detected in the blood, the long-continued use of bismuth marks the gums. Whether the sedative action on the gastric nerves is owing to mere mechanical shielding of them from irritating secretion, or to some vital change in the nerve endings, induced by contact with the bismuth, we do not know; but ample clinical experience has proved beyond doubt the great value of this drug in all *painful* gastric affections, and in the cure of dyspepsia, ulcer of the stomach, and vomiting from various causes. It is used also in diarrhœa in larger doses (1 dram), and sometimes as a cosmetic and soothing application to eczema, intertrigo, &c., and has been used as an injection in gonorrhœa and in ulceration of the rectum. The carbonate is the most active preparation, being antacid, and may be safely combined with opium or morphia. It is also credited with astringent properties.

℞.

*Bismuthi Carb*. ʒiij.
*Mucilag. Recentis* ℥*iss.*
*Liq. Morphiæ*. ʒij.
*Aquæ ad.* ℥iv. *misce.*

*Fiat. mist. St. coch. min.* ii., *ter in die ante cibos.*

**Borax**, when swallowed, is absorbed, and acts in the blood like an alkali or antacid, and passes out through the kidneys, which it stimulates, acting thus as a diuretic. It also affects the uterus, which it causes to contract and expel its contents; hence, it has been used to produce abortion and to expel retained placenta. Its emmenagogue properties, however, are uncertain, and it is only for its local action that borax is used much in medicine. Applied to a diseased mucous membrane, it soothes pain and diminishes congestion, altering the action of the part. Its action has been in this case described as astringent, but, with our present knowledge, it seems better to confess ignorance, and call it a local alterative. Of all the remedies we possess, none equal it for the painful aphthous condition of the tongue and mouth so often seen in childhood and infancy, and the glycerine of borax is decidedly superior to the preparation with honey as a basis. When it fails in these unwholesome states of the mouth it will be found that it has not been carefully applied. A wide-mouthed one-ounce bottle, filled with the preparation, should be given to the nurse to dip her index finger into (with the nail cut close) and to rub it every quarter of an hour gently round the inside of the child's mouth, and the stomatitis will soon be found to yield. It is almost equally useful in fissures of the tongue in adults.

Often after exhausting fevers, and especially in pelvic or abdominal inflammations, the mouth assumes an unhealthy aspect, with a raw and sometimes cracked tongue, which causes great distress to the sufferer; here a large crystal of borax, licked continually by the tongue, affords marked relief when all other applications aggravate. It is an invaluable remedy for ulcerated nipples, and possesses the advantage of keeping the infant's mouth healthy at the same time. A warm saturated solution applied to the scalp raises a lather like soap, and partially dissolves the dead epithelial scales. A solution of 1 dr. to 4 oz. water makes a useful lotion in itching of the labium or anus, and a tablespoonful of the powder, or twice as much of the glycerine in one pint of water, proves very valuable in leucorrhœa, and abrasions or unhealthy states of the vagina or os uteri. It is recommended in mercurial salivation as a local application.

**Bromum** is very seldom employed in medicine, except in combination with potassium or ammonium. It has been recommended as a deodoriser and antiseptic, and a weak solution is useful when applied to sloughing sores. It is a powerful caustic, and has been used as such in ulcerations of the neck of the uterus, but possesses no advantage over other more agreeable and better known remedies. It is an irritant poison.

*Bromide of Ammonium.* (See under Ammonia, and below.)

*Bromide of Potassium* is a sedative to the nervous system; it is diffusible, and after being swallowed soon enters the blood, whence it is carried to the brain and spinal system of nerves, producing drowsiness and sleep by diminishing the quantity of blood in the cerebrum and lessening reflex excitability in the cord. It diminishes the power of sensation, as shown in anæsthesia of the skin of various parts in which tactile sensibility is most developed. It produces partial loss of sensation, and diminished reflex irritability in the back of the throat, which may be freely swept round with the finger—after a course of bromide—without exciting efforts to swallow or vomit. The diminished sensibility in the pharynx has been considered by some authorities to be owing to the local effect of the salt, as it is being eliminated by the mucous membrance of the part. Bartholow, who has carefully studied the physiological action of the drug, finds that a dose of 2 drs. lowers the temperature of a healthy adult ⅕ to ½ a degree, the respirations 2 to 5, and the pulse 10 to 20 beats per minute.

Reynolds believes that the drug acts as a sedative to the sympathetic system. The experiments of Brown-Séquard prove that it contracts all the blood vessels of the brain and cord, producing anæmia, probably by acting on the vaso-motor nerves. *Bromism* is the name given to a group of varying symptoms following the prolonged use of the bromides, as anæmia, mental dulness, unsteady gait, muscular weakness and prostration, dyspnœa on exertion, loss of sexual power, sleepiness, and sometimes a smell of bromine from the breath, general diminished tactile sensibility, and eruptions of acne spots about the face and shoulders. The salt is eliminated through the skin, breath, urine, and fæces. The bromides of potassium and ammonium are almost identical in action, only the latter is of more use in whooping-cough and respiratory spasmodic affections.

Therapeutical action.—Bromide of potassium has been used in various nervous affections associated with convulsive movements, as in epilepsy, for which it is by far the best remedy, especially in the worst forms, for it is strange that the minor epilepsy, or *petit mal*, is often unaffected by it. In these cases the dose should be large—20 to 40 grs. three times a day—and animal food should be diminished or stopped during the use of the bromide, which should be continued for a long time after all trace of the disease has disappeared. Laryngismus, whooping-cough, asthma, tetanus, delirium tremens in its first stage, acute mania, migraine, vaso-motor changes (so common at the cessation of menstruation), menorrhagia, and nocturnal seminal emissions are all decidedly benefited by the bromides, and in many a cure permanently results. Sometimes, however, cases of each of these affections will turn up, upon which this remedy has not the least effect, and, in the present state of our knowledge, we are unable to distinguish them until the drug has been given and has failed. Its utility in these conditions is to a large extent explained by its power of diminishing reflex action.

In sleeplessness, arising from prolonged mental labour or worry, the bromide is invaluable. A full dose of 40 grs. at bedtime, repeated in 1 or 2 hours if necessary, produces refreshing sleep so different from that of any other narcotic as to lead one to believe it acted upon the brain (by contracting the small arteries through the vaso-motor branches) like natural sleep, which is characterised by anæmia; hence one sound explanation of its action in various affections accompanied by symptoms of congestion of the head. In this way it sometimes relieves cerebral vomiting when other remedies fail, and it stops the convulsions of several diseases, as acute hydrocephalus, &c., without in any way curing the maladies. To the above formidable list of diseases under the control of this important remedy may be added many others, when we remember that the bromide of potassium acts as an alterative like the iodide, only much more feebly; and it has been found useful in reducing enlargements of glands and syphilitic growths, and hypertrophy of the spleen, though it should only be given in these cases (owing to its uncertainty) when the iodide cannot be tolerated. Acne follows its use very often, and when it attacks the face is a barrier to its exhibition. This is largely prevented by adding a little arsenic, as in the following formula. The writer has often seen severe erythema nodosum follow its administration, and a host of cutaneous ailments have been attributed to its action.

It should not be given in anæmic conditions, and it is worth remembering that it greatly increases the hypnotic effects of chloral, belladonna, opium, and hyoscyamus; and sometimes it will be found that the effect of bromide of potassium will be increased by combining it with the bromides of ammonium and sodium.

*(For Epilepsy in an Adult.)*

℞.

*Potassii Bromidi* ℥*iss.*
*Liquoris Arsenicalis* ʒ*iss.*
*Syrupi Aurantii* ℥ij.
*Aquæ Destillatæ ad* ℥xx. *misce.*

***Fiat mistura, cujus capiat semiunciam ter in die.***

*(For Whooping-cough in a child 3 years old.)*

℞.

*Ammon. Bromidi* ʒ*iss.*
*Vini Ipecac.* ʒiv.
*Syrupi Scillæ* ʒiv.
*Tr. Camph. Co.* ʒij.
*Aquæ ad* ℥ij. *misce.*

***Fiat mist. capiat cochleare* i. *min. tertiis horis.***

**Buchu,** when administered, soon finds its way into the blood; the volatile oil, of which it contains 1½ per cent., circulates in that fluid, and on reaching the kidneys is thrown out, acting in its elimination as a stimulating diuretic. As it comes in contact with the genito-urinary mucous membrane in chronic cystitis it acts upon it, either by its own stimulating powers or by altering the previously unhealthy urine, which then becomes a tonic to the relaxed membrane. It acts, too, on reaching the stomach, as a stomachic, increasing the vascularity of that organ, and improving the appetite; hence it is occasionally administered in atonic dyspepsia.

℞.

*Tinct. Buchu* ℥j.

*Infusi ejusdem* ℥ix. *misce.*

*Fiat mist. cujus capiat cochleare amplum tertiis vel quartis horis.*

**Cadmium** is only used externally, in the form of an ointment, for application to scrofulous glands and syphilitic enlargements, as a substitute for the iodide of lead ointment, because this latter colours the skin yellow, and when absorbed causes poisonous results. It stimulates the absorbents of the skin, and alters the action in the lymphatic glands; but it might well be omitted, as it is in every sense inferior to the other soluble iodides, except in possibly possessing some astringent power.

**Cajuputi Oleum** is a powerful diffusible stimulant, and gives better and more definite results than any of the other essential oils. In addition to its antispasmodic powers, it has a slight narcotic and anodyne action, a large dose (10 minims) diluted in an emulsion with mucilage and sugar producing effects not unlike those following the exhibition of musk. It will be found useful in the prostration of low fevers, and where a decidedly stimulating effect is required to be exercised upon the nervous system.

Teaspoonful doses of the spirit of cajeput may be given every hour, in a little sherry. A full dose gives great and speedy relief in colic, probably stimulating the bowel by direct contact. Externally, it is a mild rubefacient, and may be used as a stimulating application to painful and diseased joints where there is much muscular spasm.

**Calcium**—In most of its forms, in minute doses, lime is a restorative, supplying to the blood an element found in the normal tissues. Its free use, however, like the alkalies, will be found to increase waste by quickening the retrograde metamorphosis of many constituents of the blood and tissues; for, as Bartholow points out, the organic acids and their salts decompose in the presence of oxygen and excess of alkali, and the albuminous elements of the blood are similarly oxidised.

*Chloride of Calcium* is recommended in scrofula and tubercle in 10 gr. doses. It acts as a restorative, and has been recommended in rickets and ailments characterised by defective nutrition; its utility is doubtful. In large doses it is an irritant poison.

*Carbonate of Calcium*, and *Chalk* or *Creta Præparata*, are valuable antacids, possessing feeble astringent powers. They are given when we wish to reach the intestinal surface with an alkaline preparation of calcium. Unless the dose is very small the chalk will find its way through the duodenum, the greater part still remaining as carbonate, and passing along the intestines it will neutralise any free acid which it meets with, forming a chloride or lactate; it thus diminishes the free secretion of the bowel, so that costive, hard, or dry motions are the result. We can easily see from this its value in the diarrhœa accompanied by acid acrid evacuations, especially seen in children, generally in hot weather. It is very useful in various stomach derangements with acidity, but the liquor calcis is better where we want to reach the first part of the digestive tract, and it is a good rule to order these different remedies in this systematic way—chalk for the intestines and lime water for the stomach. The lime preparations being absorbed in a very slight degree, only minute doses of them need be ordered; but where *local* antacid action is required these salts may be freely administered, though not for a very long period without stopping, as they, like magnesia, are liable to form concretions in the bowel. Externally, chalk or precipitated carbonate is useful, on account of its mild astringent or desiccant properties, when applied to weeping skin diseases, especially intertrigo about the groins and buttocks of infants, and both are valuable antidotes in poisoning by the mineral acids.

*Calx*, *Calcis Hydras* and *Liquor Calcis*—Lime, from its great avidity for water, acts when applied to moist tissues as a powerful caustic, though its eschar is very superficial. It is not often used alone, but mixed with potash and moistened before application with a little alcohol, it forms the well-known Vienna Paste used in uterine ulcerations and cancerous growths. Slaked lime (lime to which half its weight of water is added) is not used in medicine except to make lime water, which is the most frequently employed alkaline preparation of the Pharmacopœia. When it reaches the stomach it is decomposed into the chloride or lactate, and, as such, some of it finds its way into the blood. It neutralises and checks the excessive acidity of the gastric juice, when administered whilst digestion is going on. It thus is a valuable antacid, and the residue, if the dose is large, acts as a mild astringent upon the intestinal mucous membrane; and, eventually, if the administration be continued, the urine becomes alkaline, and it may thus be useful in uric acid gravel. It is best given in milk, as its taste cannot be detected in that liquid. 2 or 3 oz., mixed with three times as much milk, often soothes the stomach in painful dyspepsia, cancer, and gastrodynia, and stops the vomiting in these ailments. The addition of 1 oz. to 1 pint of cow's milk effectually prevents the formation of curdy masses, and stops infantile vomiting depending on this cause. Lime water makes a good injection in leucorrhœa.

Applied externally, lime water is a mild astringent to moist eczema, &c.; mixed with equal parts of olive oil it forms a rich creamy emulsion, or with linseed oil, it makes the popular Carron oil, so soothing to burns and scalds, and which may be improved greatly by the addition of 1 or 2 per cent of carbolic acid; and is useful when applied to cracked nipples.

The saccharated solution of lime possesses the same properties as lime water, only it is about 14 times stronger.

*Calcis Phosphas*—This salt has been much extolled by Ringer, on account of its enormous importance as a food and constituent of the body, and from its presence in excess wherever cell formation is active. Beneké has found it very useful in the diseases in which it appears in excess in the urine, and the balance of evidence is very decidedly in its favour—not, however, simply as a *restorative*, for in rickets, mollites ossium, and other lesions of mal-nutrition, the phosphates of lime may load the urinary secretion, and it is hard to see how the few grains daily absorbed could replace the great quantity poured out of the system in these cases. It is thus clear that if phosphate of lime is of use in these cases (as it sometimes undoubtedly is), it must be by *striking at the root of the error of assimilation* possibly existing in the nerve centres. In the stomach it undergoes changes, and enters the blood as a different salt. It takes, however, a long time for absorption, and probably on this account does not enter the system in the same form as the more quickly dissolved hydrate. Anæmia, pure and simple, is sometimes benefited by a course of phosphate of lime, as is scrofulous adenitis.

Parrish's Syrup is an elegant and useful form in which to administer the Phosphates of Calcium and Iron.

*Calcis Hypophosphis*, in common with other hypophosphites, has been strongly recommended in phthisis. In their action they resemble phosphate of lime, and like it they possess none of the properties of free phosphorus. Some have supposed that under the use of these remedies the tubercular or scrofulous deposits are more prone to the calcareous degeneration, and looking upon this as one of Nature's means of effecting a cure, they think that the use of these drugs should be pushed in all wasting lung diseases. Often very decided benefit follows their use. In chronic bronchitis, with much expectoration, in young subjects, accompanied with loss of flesh and sweating, the hypophosphites will often give better results than any other remedy. Probably in these cases they act as nervine tonics to the respiratory and other centres.

Fellows' Syrup affords an agreeable method of administering these remedies, and seems to supply every want, combining with the lime the tonic properties of quinia, iron, and strychnia.

℞.

*Calcis Hypophosph.* ʒj.

*Syrupi. Aurant.* ℥ij.

*Aquæ Destil.* ℥ij. *misce.*

*Fiat mist. st. coch.* i. *med. ter in die.*

*Calx Chlorata* (Chlorinated lime) is valuable, not on account of the lime, but because it gives off hypochlorous acid, a powerful oxidising agent which destroys any organic matter with which it comes in contact. It also gives off chlorine, which splits up any remaining matter by seizing on its hydrogen, and setting oxygen free. This double action makes this substance invaluable as a deodoriser. Plates covered with chlorinated lime, and moistened with water, placed in different corners of the sick room, give off, through the agency of the carbonic acid of the room, as much hypochlorous acid and chlorine as keep down effluvia of all kinds. If more rapid deodorisation is required, the room is treated in a different way: the patient having been removed, the salt is placed in a deep basin, and diluted sulphuric acid poured on it, and the room closed up for 24 hours; in this way all the chlorine is at once liberated, and seizes upon the hydrogen, splitting up the ammonia, sulphuretted hydrogen, &c., with which it comes in contact.

Disinfection, or the killing of the germs which cause disease, is a very different thing from deodorisation. Probably this salt disinfects also, but it remains to be demonstrated.

By destroying the germs which cause putrefaction it acts as an antiseptic, and it destroys odours much better than carbolic acid, which has little power in this way, though this latter is a better antiseptic, having more energy over the germs which cause decomposition.

These effects show how useful chlorinated lime may be when applied in dilute solution to foul wounds and cavities where pus lingers and decomposes. ½ dram of the solution added to 1 oz. water makes a good gargle in malignant scarlatina or diphtheria with fetid ulceration.

Internally, this salt has been recommended in putrid fevers, and may be given in the form of the solution, in 20 minim doses in peppermint water. It probably enters the blood as a hypochlorite, and, coming in contact with the members of the leucin and tyrosin class, converts them into more easily excreted salts.

**Calumbæ Radix** is one of the most popular pure bitter tonics, and, possessing no tannin, is devoid of astringency, and may be freely given with iron. Chiretta, Quassia, and Gentian closely resemble Calumba in their effects upon the stomach. By the impression which they make upon the peripheral filaments of the nerves of the tongue and mouth, they increase the saliva and the gastric juice probably even before being swallowed, but they increase to no appreciable extent the pulmonary mucus, as the ciliary excitants do. The gastric juice is further increased when they reach the stomach, and probably the vascularity of the organ is somewhat augmented, since these remedies in large doses cause irritation, and, when long continued, a low form of gastritis, apparently by over stimulation. The gastric secretion being thus more freely poured out, the supply regulates the demand, and the appetite is improved. Changes of a similar nature probably occur further down the intestinal tube, and the digestion beyond the duodenum is possibly improved; hence, if in our dim knowledge of impaired digestion in the intestines we *suspect* such a state of matters, we may give the extracts of these vegetables in full doses, in pills, and probably will find uneasy abdominal symptoms disappear, and body-weight increase. The bitter principle eventually finds its way into the blood, and it is impossible to say whether it acts as a restorative, supplying to that fluid something like itself in which it is deficient, or whether it acts directly through the nervous system.

These bitters are used in dyspepsia, and in the debility attending convalescence from acute diseases, where they are sometimes invaluable in stimulating the appetite and digestion, and sometimes have a sedative action upon an irritable mucous membrane, thus controlling nausea and vomiting. To get the full benefit of a vegetable bitter it is necessary to order its various preparations in combination.

℞.

*Tinct. Calumbæ* ℥j.

*Infus. Calumbæ* ℥vij. *misce.*

*Fiat mist. cujus capiat cochlearia duo ampla ter in die ante cibos.*

**Cambogia**—Gamboge is a hydragogue cathartic; when swallowed in large doses it acts as an irritant to the mucous membrane of the digestive tract, exciting the various glands to pour out increased secretion, and thus augmenting considerably the watery element in the motions, which, after a full dose, become liquid. The vermicular contractions are greatly intensified, and the contents are swept rapidly down the canal; but it is only in large doses that gamboge acts in this direct way.

Small doses are absorbed, probably by the blood-vessels of the stomach, and are eliminated through the intestinal glands lower down, which they stimulate, thus freeing the blood of much water. Its action is severe, and the griping pains caused by it are very annoying, so that it is seldom now used alone, though it is an excellent addition to many purgative pills. In small doses it is diuretic, and the colouring matter stains the urine. The compound pill may be given in 5 grain doses every 6 hours in dropsies and obstinate constipation. The action of gamboge is more marked on the small intestine than on the colon. In large doses (under a dram) severe inflammation of the alimentary tract results, and death supervenes, unless, as is nearly always the case, active vomiting expels the drug early. It has no action on the liver, though the presence of bile seems necessary for its absorption.

☞ In poisoning with gamboge, the treatment should be directed to the inflamed condition of the gastro-intestinal tract, demulcent drinks and emollient enemata should be administered, followed by small doses of opium.

℞.

*Cambogiæ gr.*j.
*Extr. Aloes Aq. gr.*j.
*Extr. Colocy. Co. gr.*ij. *misce.*

*Fiat pil. mitte tales* xvi., *st.* i *om. nocte.*

**Camphora** is very uncertain in its action, and the effects produced by small doses are so variable that it is not often employed internally, save as a flavouring ingredient as in the Aqua Camphoræ, or with the idea of some mild expectorant action, of which it is the doubtful possessor. In large doses (30 grs.) it is a diffusible stimulant, directly causing a flow of blood to the gastro-intestinal membrane, as it does when applied to the skin in a concentrated form. It reaches the brain after absorption, producing, when repeated in this dose, a comforting or exhilarating effect, occasionally going the length of gay delirium, with increase of the strength of the pulse; and when continued for some time it produces loss of power of the sexual functions. This latter may be said to be the only definite useful result of the internal administration of camphor, and it consequently is valuable in excitement of the genitals, chordee, emissions, &c. The vapour is reputed to possess marked effects over catarrhal affections of the respiratory membrane, and 10 grs. added to each dose of expectorant mixture are useful in the chronic bronchitis of the aged, and 20 gr. doses, repeated every six hours, benefit dysmenorrhœa.

Externally, it is a stimulating application, useful in chilblains, and its mild rubefacient properties render it a popular ingredient in most liniments for rheumatic troubles. The Compound Camphor Liniment is a powerful counter-irritant, and may be made to cause vesication. ½ dr. to each oz. of zinc ointment allays the itching of eczema about the genitals.

Milk dissolves camphor readily, 1 oz. taking up nearly 1 dram of it, and is the best method of administering the remedy, especially in low fevers, where a teaspoonful of the milky solution may be given every three hours.

**Canellæ Albæ Cortex** is a mild stimulating stomachic, increasing the vascularity of the gastric mucous membrane, and augmenting its secretion, and has been used as a condiment. It is now only employed to flavour rhubarb wine.

**Cannabis Indica** is a true narcotic, like alcohol or opium, producing first a period of excitement, or intoxication, followed afterwards by sleep and coma. Its exciting stage, however, is better marked than that of these remedies, and is much longer than that of opium. The intoxication, often lasting a couple of hours, is characterised by delirium of a pleasant or boisterous kind, with surprising mental confusion and distorted ideas of the patient's individuality and position, alternating with fits of prostration bordering on catalepsy, and followed eventually with sleep, in which pleasant or mirthful dreams generally run riot. It in no way affects the stomach, but increases markedly the appetite for food, and is a powerful aphrodisiac. The sensibility is diminished, cutaneous anæsthesia and blunting of the muscular sense being observed. The pupil is not contracted, constipation does not follow, and sweating is never great; hence its use has been followed by gratifying results as an anodyne in neuralgia (Ringer has shown its great worth in migraine), a hypnotic in sleeplessness and delirium tremens, an antispasmodic in destroying spasm and pain, as in asthma, hepatic, and renal colic, &c. It is stated to act as a direct stimulant to the uterus in menorrhagia, and it allays ovarian irritation.

The tincture should be given in sherry, or a teaspoonful of brandy, on account of its decomposition when added to water; but one ounce of mucilage emulsifies 1 dr. of tincture. The *fresh* extract (⅔ of a grain) made into a pill will be found the most reliable form, as in the following:—

℞.

*Ext. Cannabis Ind. gr.*iv.

*Pulv. Gentianæ q.s. ut. fiat. pil.* vj.

*E quibus sumatur una omni nocte.*

The following is an elegant form for painful gastric affections:—

℞.

*Bismuthi Subnit. gr.*lx.

*Ext. Cannab. Ind. gr.*vj. *misce.*

*Divide in pil.* xii. i. *bis in die.*

**Cantharis** is not often administered internally, though it produces definite results, acting as a powerful stimulant to the genito-urinary organs, causing in over-doses frequent painful bloody micturation, with priapism, bloody, painful stools, and symptoms of violent irritant poisoning, followed by convulsions and delirium.

In small doses it is diuretic, aphrodisiac, and emmenagogue. The cantharides is absorbed, and, circulating in the blood, reaches the urinary organs, which it stimulates as it is being eliminated. The mouth, stomach, and intestines are affected by direct contact with it after being swallowed, and its action on the genital organs and uterus is generally explained by the sympathy that exists between these parts and the urinary tract.

It has been advocated in various kidney diseases, even in the acute affection, by Ringer, as a diuretic, and it is valuable in bladder cases which are characterised by want of power in the sphincter, especially in women. Its use is often beneficial in impotence, gleet, and leucorrhœa.

One, two, or three minims of the tincture will be found enough for an ordinary dose. It may be given in barley water every 3, 6, or 12 hours.

Externally, cantharides is used diluted in various ways as a rubefacient, as in stimulating applications to the scalp, where the object is to keep up a constant excessive supply of blood for the nourishment of the hair bulbs, but it is for producing vesication that the Spanish fly maintains its importance in medicine. It acts by causing a rapid local inflammation of the skin, beginning with tingling pain, heat, redness, and eventually swelling; serum appears in from 4 to 12 hours. The peripheral extremities of the nerves supplying the skin of the affected part undergo molecular alteration, which probably extends to the nerve centre, and establishing such temporary molecular alteration there, as may be radiated, transferred, or reflected to centrifugal or trophic nerves, which may effect various changes in the areas to which they are supplied. In this, the most probable explanation, it is easy to see (1) the effect which blisters may produce upon distant parts; (2) they also affect parts in the immediate neighbourhood by extracting the blood from them, though this must be to a small extent; (3) they may affect neighbouring parts by direct spread of the irritation originally produced, as the peritoneum and pleura have been often seen inflamed from the application of a blister to the abdomen or chest; and the writer believes that he has seen pericarditis produced in this way in thin subjects. Space will not permit any further reference to the subject of counter-irritation; but a few instances where blisters prove beneficial in altering diseased action may be mentioned, as in neuralgia. Anstie pointed out that blisters applied over the seat of pain intensify the suffering, and should be applied close to the spine

—over the posterior branch of the spinal nerve-trunk—from which the painful nerve issues; and sciatica is often benefited by a small blister. Various eye inflammations are modified or checked by counter-irritation behind the ear; and though the usefulness of blisters is doubted in acute pleuritis and pneumonia, there can be little question of their value in causing the absorption of long-standing pleural effusions, in which cases great good is derived from *flying blisters*—that is, a series of very small blisters (each not larger than a crown), kept on for a short time—say, two hours. Indeed, it may be laid down as a rule that any benefit to be had from a blister is obtained during the first five hours of its application, all of which time it keeps up a stimulating effect upon the general system; after this, much depression often results, which cannot be accounted for, as some suppose, by the mere loss of serum; if vesication does not occur in this time a poultice generally determines it. Moistening the skin with warm water before applying the blister assists its action.

In acute rheumatism, blisters to the affected joints have been long advocated; but Dr. Harkin has recently pointed out surprising results obtainable by a large blister over the heart, early in the disease, and the writer has seen it reduce temperature and pain in a most decided way; but he believes the heart is much more liable to become affected in cases so treated early in the disease. Dr. Graves recommended blisters in various prostrated feverish states, and counter-irritation over the nape of the neck controls many forms of headache.

For all purposes the emplastrum cantharidis is the most manageable preparation, spread on adhesive plaster, as described in the beginning of this work; the liquor, however, acts much more quickly. Unless the bleb is large, it may be let alone, the blistered surface being covered with greased lint or cotton wool. Sometimes cantharides affects the urinary organs after a blister, by being absorbed through the skin; free diluent drinks, with a morphia suppository, generally remedy this.

Blisters should not be applied or kept long, on the old or infirm, or on paralysed parts, or on the very young, or in acute kidney diseases.

☞ *Antidote.*—Oil, olive or almond, should be freely swallowed, and given in enemata; and chalk may be combined with it, and laudanum added.

**Capsicum** acts as a general stimulant to the nervous system, and when taken into the mouth increases the secretion of the salivary glands. When swallowed it acts as a stimulant to the mucous membrane of the stomach, and increases its secretion, its internal local action being probably like its external rubefacient effect, so that it might be called an internal rubefacient. In repeated doses it produces a slight narcotic effect upon the brain, and increases the functional activity of the genital organs. In large doses it causes gastro-intestinal irritation, or inflammation, and acts as a diuretic.

The stomachic effects of cayenne have been long recognised, as seen in its free use as a condiment and appetiser in warm climates, and it is useful in dyspepsia, and invaluable as a tonic in dypsomania, in which 10 to 20 minims of the tincture may be given every two hours before meals, as pointed out by Lyons. In delirium tremens large doses (30 grs.) often produce sleep. Locally, it is useful in the form of a gargle in relaxed throats, and concentrated preparations will redden the skin almost to vesication, but with much pain and burning.

℞.

*Tr. Capsici* ʒj.
*Infus. Rosæ Acidi* ℥vj.
*Aquæ Destillatæ* ℥vj. *misce.*

*Fiat gargarisma sæpe in die utendum.*

℞.

*Tr. Capsici* ʒiij.
*Spt. Ammon. Aromat.* ʒiij.
*Tr. Calumbæ* ℥j.
*Tr. Card. Co.* ʒvj.
*Aquæ ad* ℥viij. *misce.*

*Fiat mistura, signa. "A tablespoonful with the same quantity of water every two hours, or when the craving for drink comes on."*

**Carbo Animalis and Carbo Ligni**—The first is only employed internally as an antidote in poisoning by the alkaloids morphia, strychnia, &c., with which, if given immediately afterwards, it combines, and renders their action harmless—½ oz. neutralising 1 gr.—but its administration should not interfere with the use of more certain and reliable means, as the stomach pump, emetics, &c.

Internally, wood charcoal is administered in flatulent conditions of the stomach and intestines as an absorbent and deodoriser, and it occasionally checks vomiting and the formation of gas, and stops fermentation independent of its power of absorption.

Externally, charcoal acts as a powerful deodoriser and antiseptic, and, as such, may be freely applied to putrid sores and gangrenous limbs, or it may be spread on plates to sweeten the air of the sick room. These properties depend upon its power of absorbing and condensing in its pores gases like oxygen, which destroy the gaseous products of putrefaction by coming into direct contact with them. The charcoal poultice is an excellent application to foul ulcers. Animal charcoal, though seldom administered, may be given like the wood preparation, in teaspoonful doses in water. It should be freshly prepared or reheated before use.

**Cardamomum** acts as a warm stomachic, increasing by its stimulating action upon the gastric surface the secretion of the part, and improving the appetite. Its local stimulating influence increases by reflex action the peristaltic movements of the intestines, and thus flatus is dispelled. It makes a good corrective addition to purgative medicines, and, as the tincture is of a bright red colour, compatible with most drugs (iron excepted), it is a prized flavouring and colouring ingredient, and medicine containing it has a better chance of remaining in an irritable stomach than if given alone.

**Carui Fructus**—Its action is explained under Anethum, with which it is practically identical.

**Caryophyllum** — Cloves — when administered, act as a stomachic. This remedy resembles the previous two in its tonic, carminative, and stimulating effects The essential oil is powerfully antiseptic, preventing decomposition; when applied to the terminal filaments of a painful and irritated nerve it acts as an efficient anodyne; hence its use in tooth-ache and in some cases of superficial neuralgia. Five drops on a little sugar speedily remove pain caused by accumulations of air in the bowel, by exciting reflex muscular contractions, driving the air forwards or backwards, relieving the over distention, and acting as a local anodyne upon the irritated nerves of the part.

**Cascarilla** is an agreeable tonic, acting like Calumba, only it possesses decided aromatic qualities. It has feeble febrifuge properties, like cinchona, and the volatile principle which it contains may possibly act upon the respiratory mucous membrane. It is useful in dyspepsia, where a stimulating

**tonic is indicated, and when smoked in a pipe it is valuable as a substitute for tobacco when we wish to wean heavy smokers from their vice. Dr. Smith, in his commentary, gives the following formula for an acceptable tonic, useful in convalescence from fevers, which often does good when other tonics are not tolerated :—**

℞.

*Acid. Nit.-Mur. dil.* ʒij.

*Tinct. Cinch. Co.* ℥j.

*Infus. Cascarillæ ad* ℥viij. *misce.*

*Capiat* ℥*ss. vel* ℥i. *ter in die.*

**Cassiæ Pulpa**—This preparation is very seldom used in medicine except as an ingredient in senna confection. It is a mild laxative, like manna, and it probably acts by stimulating the peristaltic movements of the intestines.

**Castoreum** is seldom employed. It resembles assafœtida in its action, and is regarded as a weak emmenagogue and antispasmodic, relieving the pain in the bowel caused by gas distending the tube. Its disagreeable smell is supposed to explain its use in hysteria. Large doses excite the nervous system feebly. Probably the next edition of the Pharmacopœia will exclude this remedy.

**Cataplasmata** are used in medicine with different intentions : thus sinapis is a rubefacient, lini an emollient, conii a sedative, and carbonis and sodæ chlor. antiseptic ; but linseed is by far the most freqently employed. When a hot linseed poultice is applied to a part, the warmth causes the small vessels to dilate freely ; the muscular elements in the skin, hair follicles, and gland ducts are relaxed, and thus the tissues get soft, and the tight feeling or tension of inflammation is reduced or passes away ; the sensitive nerve-endings, experiencing less pressure, may undergo some molecular change, which passes through the course of the fibres, and eventually may change the condition of the nucleus and affect alterations in distant parts or in neighbouring tissues. Thus, a warm poultice applied to the inflamed hip joint sometimes relaxes spasm of the muscles and diminishes the transferred knee pain.

Poultices should be as warm as can be comfortably borne ; a very hot poultice will often aggravate pain and tension by acting as a direct local stimulant.

The question often arises, when should poultices be applied to local inflammations, as in a case of whitlow? A strange paradox may be observed here: if applied early general relaxation of the tissue is the result, and the tension which is fatal to the life of a part is removed, and resolution is more liable to occur; but if inflammation has already progressed so far that the white corpuscular elements have wandered through the coats of the vessels, or a purulent collection has already formed, poulticing assists it materially in reaching the surface. Thus poultices, by making the part an internal one, are useful in all stages of inflammation; if applied early they prevent suppuration, and if used in the advanced stages they hasten or encourage it; and if an antiseptic quality existed in them, everything that is desired would be achieved. We have this desideratum in the spirit lotion when covered in with oiled silk. It then becomes a poultice free from the objections to this class of remedies, which are so liable to generate septic poisoning after the skin breaks.

**Catechu** is a valuable astringent, acting exactly like tannic acid (which see). It is given in passive diarrhœas and hæmorrhages, and is well suited for the treatment of such cases in children.

*(For Diarrhœa in a child 1 year old.)*

℞.

*Tinct. Catechu* ʒiij.

*Spt. Chloroformi* ʒiss.

*Misturæ Cretæ Co. ad* ℥iv. *misce.*

*Fiat mist. cujus capiat cochl.* i. *min., post singulas dejectiones liquidas.*

**Cera Alba, Cera Flava, and Cetaceum** are seldom employed internally. When swallowed they act as protectives or demulcents, by covering over the gastro-intestinal surface from irritating secretions, and externally they are largely employed as emollients. Possessing bland, unirritating qualities, they are valuable in making the groundwork or basis of more active ointments or cerates. Spermaceti formerly was much employed as an expectorant, but it most probably is devoid of such virtue. It may be given beaten up with egg and warm milk.

**Cerevisiæ Fermentum** has been found a tonic stimulant in fevers, and was used by Dr. Stoker as such, in 10,000 cases, as mentioned by Neligan. It is a laxative and deodoriser, and prevents the decomposition of matters in the bowel. It is used now only as the yeast poultice, to correct the fetor of putrid sores, and this preparation seems to owe its efficacy to carbonic acid. It causes pain, and possesses no special advantages over other more manageable deodorants.

**Cerii Oxalas** (acting probably like bismuth) is a gastric sedative. The Pharmacopœial dose is 1 to 2 grs., but 5, or even 8 grs., may be given. It was introduced as a remedy for the vomiting of pregnancy, but it is gradually falling into disrepute. It has been tried in epilepsy and chorea with very doubtful results.

**Cetraria** is a feebly nutritious tonic, containing a considerable quantity of starch and a small amount of bitter principle. It is largely eaten as food by the Laplanders, and, by its demulcent properties, when made into blanc-mange, is useful to many dyspeptics. It has been praised as an expectorant, but any properties it possesses in this way are well obtained by chewing it; especially if picked up fresh along the coast, and masticated, it will be found to act as a ciliary excitant of no mean power. When swallowed, it is very improbable that the dried lichen has any action over the bronchial membrane.

**Chirata** is a pure bitter tonic, exciting very gently the secretion of the gastric juice, like calumba, gentian, and quassia, aiding digestion and improving the appetite. Its effects are best seen in the atonic state of the stomach of drunkards after a prolonged course of drinking, and it may be combined with bismuth or a mineral acid, the former if nausea or vomiting, the latter if a furred state of the tongue exist. It will be found that this bitter is least likely to disagree with the strong bilious temperament, which often will not bear quinia or iron.

℞.

*Tincturæ Chiratæ* ℥iss.

*Acid. Hydrochlor. Dil.* ʒiv.

*Infus. Chiratæ ad* ℥viij. *misce.*

*Capiat cochleare unum magnum ex cyatho aquæ ter in die.*

**Chloral Hydras** is readily absorbed after reaching the stomach, and, it is supposed, acts by producing an anæmic condition of the brain, as it induces sleep identical in every respect with sound, natural, refreshing slumber, lasting 5, 6, or

8 hours, devoid of dreams, and free from stupor and narcotism, and not followed by gastric or other trouble. It does *not* act, as Liebreich supposed, by being decomposed in the blood, into chloroform on meeting the alkali of the circulating fluid, since this is too weak to decompose it, and the odour of chloral and not of chloroform is perceived from the breath; and, moreover, a corresponding dose of chloroform will not affect the system in the same way, being more decidedly narcotic and anodyne than chloral.

Chloral does not relieve pain, nor influence the nerves of sensation; hence if severe pain is present, chloral, unlike opium, will not relieve it, unless in dangerous doses; and, if the pain continue, probably no sleep will supervene. Reflex spinal irritability is weakened by large doses; and if a still larger quantity is administered great muscular relaxation, loss of sensation, and deep coma occur. Death results from paralysis of the heart by its effect upon the cardiac ganglia, or stoppage of the respiration ensues through its effect upon the respiratory centre. The temperature falls markedly, and Brunton found that this fall was so great as to alone cause death. The motor nerves or muscles are not directly affected, and the pupil is only a little contracted at first, and afterwards dilates moderately.

Chloral is an excellent hypnotic in sleeplessness, caused by over-work or worry; but delirium tremens is the affection in which its virtues have been most prized. Given in 30 or 40 gr. doses it produces refreshing slumber; but it is in the early stage of the disease that it is most valuable. After the delirium has lasted several days the writer believes chloral to be a dangerous remedy, which must be used with great caution, if employed at all, the heart at this time being especially susceptible to its action.

It has been used with benefit in puerperal convulsions, chorea, whooping-cough, asthma, sea-sickness, and acute mania; and it is highly beneficial, and often curative, in tetanus. Some think that it relieves the early pains of labour, without directly hindering the uterine contractions.

Chloral should be given with great caution to patients with fatty hearts or atheromatous vessels; and as its hypnotic effects come on in a very short time (less than 30 minutes), and pass off as rapidly, it should be repeated inside an hour if the effect is not produced, and the patient should always be in bed before swallowing the first dose. Externally it is a good Antiseptic, and a lotion of 8 grs. to 1 oz. is a painless stimulant to unhealthy ulcers, which sometimes heal when so treated, after resisting everything else.

☞ Strychnia is said to oppose chloral, and may be given hypodermically after the use of the stomach-pump and stimulants. The writer has found benefit from large hypodermic doses of ether, and careful attendance to the maintenance of the heat of the body in chloral poisoning.

The following is a good form for the administration of this drug, which is intensified by bromide of potassium or opium:—

℞.

*Chloral. Hydrat.* ʒiiss.
*Pot. Bromidi* ʒiij.
*Syr. Aurant. Floris* ℥j.
*Aquæ Menthæ Pip. ad* ℥vj. *misce.*

*Fiat mistura, cujus capiat unciam hora somni et semiunciam omni hora ad effectum.*

**Chlorine,** when inspired, acts as a powerful irritant, causing death from spasm of the glottis or inflammation of the air passages; greatly diluted with air it is a stimulating expectorant.

Externally applied, it is a rubefacient, but it is only used in medicine for its powerful antiseptic and deodorising properties. In presence of water the chlorine seizes upon its hydrogen, and sets free the oxygen in a very active form, which decomposes the animal tissues and emanations. (See Calx Chlorata.) Internally, the solution of chlorine has been recommended in fevers, on the strength of the zymotic theory of their origin; but its use is probably erroneous in such cases, as it becomes soon so diluted by the mass of the circulating fluid as to be rendered innocuous to the supposed germs.

☞ *Antidote* to the vapour—Ammonia gas inhalation; to the liquid preparations or Calx Chlorata—Albumen.

**Chloroform** is used in medicine as an inhalation to produce general insensibility, and, when swallowed or applied externally, as a remedy for various complaints. The vapour, when inhaled, gives rise at first to symptoms often differing widely in different individuals, and depending upon some peculiarity of the patient. Generally three well-marked stages may be observed:—

1st—The "Preliminary Stage," with some cough or suffocative feeling, exhilaration of spirits, sounds in the head, mental confusion, with congestion of the eyes and face, and blunted sensibility.

2nd, or "Struggling Stage," with marked mental or motor excitement and intoxication, acceleration of the pulse (from excitement), and greatly diminished sensibility;

Rapidly passing into

3—"The Anæsthetic Stage," or state of complete narcosis, where there is total insensibility and muscular relaxation, with suspension of the cerebral functions, loss of reflex action, diminution of the pulse, and contracted pupils.

The operator recognises this stage by lifting up a limb and it falls perfectly flaccid; by touching the conjunctiva, when no attempt at winking occurs; by exposing the iris suddenly to light after having the lids closed, and sluggish contraction follows; by pinching strongly the skin of a sensitive place, and not the slightest wincing is noticed.

If the inhalation is pushed further, death may occur. 1. By the heart becoming directly paralysed through the influence of the chloroform on the cardiac ganglia; and this may happen at any stage, and often gives no warning. 2. The respiration is interfered with, so that death occurs through apnœa from the stoppage of the breathing, either by paralysis of the respiratory muscles, through the action of the chloroform on the respiratory centre, or on account of the tongue falling back, or vomited matters getting into the trachea.

☞ The pulse and respiration must be carefully watched, and the failing of either met with the instant removal of the inhaler; and if there be asphyxia, the tongue should be drawn forward, or artificial respiration, which is the best remedy to rely upon, may be performed; the cold douche may be used at the same time; galvanism is doubtful. Nitrate of Amyl, Ammonia inhalation and tracheotomy have been recommended.

Various inhalers are used. Clover's, which prevents the vapour reaching the lung in a more concentrated form than four per cent., is, perhaps, the best for those who are not familiar with the administration; but the open sponge or towel, with the chloroform dropped on it, answers every purpose, and one dram will be enough to begin with. No food should be allowed for 4 hours previously, but the plan of starving for a longer period than this is to be condemned, as it leaves patients in a bad condition to resist the effects of hæmorrhage or shock, especially those with vigorous digestive powers, who are accustomed to the stimulus of food every four or five hours.

Chloroform should always be administered with great caution, but if there be fatty or other disease of the heart the caution should, if possible, be increased. There is hardly any state of the system in which the drug may not be used, an it may be administered at all ages, children, as a rule, bearing it well. The vomiting so often following its use may be to a great extent prevented by a previous hypodermic injection of morphia, to which a little atropia has been added.

Under the head of Æther, the relative value of these two anæsthetics is spoken of, but there can be no such thing as relative value. If ether is proved to be, beyond all doubt, safer than chloroform, then it alone should be used; for all the minor disadvantages, such as its smell, tardiness, liability to cause sickness, &c., cannot be weighed in the balance against safety.

Chloroform inhalation is employed in surgical operations, puerperal and uræmic convulsions, during the progress of gall stones and renal calculi, and largely in obstetric practice, in which it is most decidedly freer from danger than in any other class of cases, and the third stage of its action should never be experienced in labour unless where a difficult instrumental delivery is about to take place. The patient can be kept just upon the border of dreamland, without producing insensibility. In a host of spasmodic ailments, as laryngismus, pertussis, and asthma, the vapour of chloroform is highly beneficial, and often curative, and it is of great benefit to the physician in carrying out the diagnosis of phantom and uterine tumours.

Internally, chloroform in small doses acts as a gastric stimulant, rapidly followed by sedative effects. A close observance of its local action on the stomach would almost lead one to suppose that the peripheral nerves were affected in the same way as a pure narcotic affects the great centres. It acts in this way when given in 1 minim doses, properly diluted, and relieves gastralgia, vomiting, sea-sickness, and reflex headache. From 10 to 20 minims affect the system, causing, after absorption, marked narcotic effects, and, if repeated, symptoms resembling those following its inhalation; administered in large quantities, undiluted, it acts as an irritant poison. From its effects upon the centres of sensation, it is useful as an anodyne, relieving pain, inducing sleep, and preventing spasm, and its influence is intensified when opium is combined with it. Cough is often relieved and hiccough stopped by such a combination.

Externally, chloroform applied on lint to the skin, and quickly covered with oiled silk, acts as an irritant, occasionally producing vesication. If uncovered, or if diluted before being applied, it acts as a local anæsthetic by its influence over the endings of the sensory nerves, and hence it is useful in neuralgia and odontalgia, and often relieves the itching of urticaria.

Dr. Waller has shown that it greatly assists the absorption of many substances through the skin, the chloroform rapidly penetrating the cuticle and dermis, and carrying with it the dissolved substance. In this way morphia readily finds its way into the blood.

The "deep injection," as originally introduced by Bartholow, is a valuable method of subduing neuralgic pain. He injects 10 minims or more of pure chloroform through a hypodermic needle thrust down deeply into the tissues surrounding the affected nerve.

**Cinchona and Quinia**—Cinchona differs from its alkaloïd, quinia, in possessing (1) decided astringent qualities, which it owes to the amount of tannic acid contained in it; (2) in being much more bulky—about 50 times; (3) in being more apt to cause local gastric irritation; and (4) in being longer in the stomach and canal before absorption. If not the most important drug in the Pharmacopœia, cinchona, or its alkaloid, may rank as first for its usefulness to mankind, since, unlike opium, its good has been unmixed with evil.

The results of experiments outside the body demonstrate quinia to possess great power as a destroyer of life in minute organisms. Less than one grain dissolved in one ounce of water will cause the instant death of active infusoria and fungi, and double this strength prevents or checks the alcoholic fermentation, and destroys putrefactive decomposition, acting as an antiseptic, like carbolic acid. Its costliness, however, is a barrier to its use as a medicinal antiseptic, but the powdered bark is occasionally applied to foul and sluggish sores with great benefit, its astringent properties acting the part of a tonic, whilst the alkaloid checks putrefactive changes.

In small doses, quinia may be taken as the type of a tonic, increasing at first the activity of the process of secretion in the stomach, but after a time checking it; and if continued too long, or if the dose be increased, the digestion and appetite become somewhat impaired, and an irritated condition of the gastric mucous membrane results till the drug ceases to be administered. The same changes probably occur all down the intestinal tract.

There is considerable diversity of opinion regarding the effect of quinia upon the pulse, but it may be said, with some degree of certainty, that very small doses have *no* effect on its beats; moderately large doses (10 to 20 grs.) increase the number of pulsations, whilst slightly diminishing their power; and very large doses (40 to 80 grs.) cause marked and dangerous cardiac depression, with great fall in the number of pulsations and diminished arterial tension.

On the temperature of the body fairly constant effects may be observed after the free use of quinia; thus in health it appears (short of serious doses) to possess no influence over the body heat. In disease, however, the case is different, full doses of the drug causing, with some degree of certainty, a steady diminution in the temperature when this is considerably above the normal standard.

Thus quinia ranks as an anti-pyretic, and various ideas prevail as to how it acts in these febrile affections. Its influence over the circulation does not account for it, and it is not probable that it exercises its beneficial effects solely by its direct action on the nervous system.

Professor Binz believes that quinia in febrile diseases "acts by directly combating the efficient cause of the disorder, and by checking the abnormal metabolism going on in the body, the nervous system taking no part, or only a secondary part, in the operation." It is thus probable that quinia destroys the activity of the low organisms, like ferments, which have been found to exist in the blood, and which many believe are the direct cause of the febrile condition. To cause the death of such organisms outside the body would require contact with a solution of sulphate of quinia of the strength of at least 1 in 900; and after, say half a dram of this drug was administered, assuming it all to be absorbed and retained in the blood, a solution of not more than ⅛ this strength would be operating upon them. Though this of itself would appear by direct experiment to be unequal to the task of destroying fungi and infusoria, it might be much more than enough for the destruction of organisms living in a vital fluid, which is itself antagonistic and unfavourable to their existence.

With our present knowledge, however, the operations of various drugs circulating in the blood are so mysterious and difficult of demonstration that this explanation of the action of quinia must be received with caution.

Quinia has been proved to possess a peculiar power over the movements and wanderings of the white corpuscles of the blood, and hence some have supposed, but apparently without sufficient evidence, that by thus checking the amœboid movements of the corpuscles, quinia reduces the size of the spleen in ague, and checks inflammations in their first stage.

The red corpuscles are prevented from exercising their oxygen-carrying functions by large doses of this drug, and marked diminution is observed in the quantity of uric acid excreted by the kidneys. The reflex function of the cord is diminished, and quinia does not appear to have any direct effect upon the vaso-motor nerves, and its influence in causing contraction of the uterus is uncertain.

It is in the treatment of intermittent fever that quinia is so valuable, for not only will it rapidly cure the disease, but it also affords protection to those healthy subjects exposed to the malarial poison which produces the fever. Its action here has been long believed to depend upon its destructive power over the minute organisms, which there is fair reason to believe are the cause of ague, and which have been repeatedly found in the blood and tissues of the subjects of malarial poisoning.

In the milder forms of ague the best method of administering quinia is to give it in small doses regularly four or five times a day; but in malignant attacks it must be pushed without hesitation in large doses. Some give 10 to 20 grs. one hour before the fit, but half this quantity may be regularly given every six hours in bad cases. Bartholow believes the best rule is to give 10 grs. during the sweating stage, and repeat it five hours before the next paroxysm.

The use of the drug should be continued for a time after the disappearance of symptoms, and if the stomach will not tolerate it, it may be given by the rectum or injected under the skin with the ordinary hypodermic syringe, a solution in ether affording the most elegant and harmless form for injection.

In remittent fever quinia may be given in moderate doses during the remission, but it is advisable to give one full dose (10 to 15 grs.) at once without waiting for the remission.

Large doses of quinia, or moderate doses of 2 to 5 grs., frequently repeated, give rise to a group of unpleasant symptoms, called "cinchonism," viz.—ringing noises in the ears, or deafness more or less complete, partial blindness, headache, and delirium, with nausea and insomnia. These effects, Harley believes, are produced by the direct action of quinia upon the nerve vesicles, and they explain how "its beneficial influence is seen in those cases where, so to speak, the nervous system is unstrung—where, from sheer debility and relaxation of the nerve vesicles, the nerve currents are jarring and painful." Other observers (amongst whom is Binz) believe that cinchonism depends upon anæmia of the brain, while it has been asserted that congestion of this organ has to answer for the symptoms following large doses of quinia or cinchona.

In febrile conditions larger doses are tolerated without causing unpleasant effects. In Germany, the sulphate of quinia is administered in fevers in 40 gr. doses, and seldom are any evil effects noticed.

Besides the use of quinia as an anti-pyretic remedy in typhoid, typhus, variola, pneumonia, and acute rheumatism, it has been employed with marked benefit in various septic states, and in pyæmia and all exhausting suppurative conditions. The theory that it acts beneficially in disease by destroying minute organisms has led to its advocacy in whooping-cough, intermittent hæmaturia, hay-fever, &c.

Quinia has been proved to be valuable in various forms of neuralgia, especially in those with well marked periodic exacerbations of pain, and in the anæmic, and in those suffering from prolonged worry and mental over-work. It should be given in 5 to 10 gr. doses, at bed-time, with a full opiate.

It has been recommended in chronic suppurative bronchitis, but the writer has found it always to increase the difficulty in coughing up the expectoration; intelligent patients complain of this, no matter how the drug is disguised. It is probable that it exercises some toxic effect upon the cilia in these cases, which necessitates the respiratory muscles and bronchial tubes discharging the duty often silently performed by the cilia; at the same time, the secretion is diminished in amount and increased in viscidity, but not to an extent sufficient to account for the distress often following its use.

The greater part of the quinia administered passes out of the body in the urine, the elimination lasting several days; some probably remains in the system. It has been thought that this drug produces many of its almost magical effects by acting as a *restorative*, and supplying to the blood some substance identical with one which is believed to form a natural component of the body, and upon the absence of which the disease is supposed to depend. This fanciful hypothesis appears to have some foundation.

The various alkaloids and extractives found in bark have not received the attention they deserve; but none of them appear to exercise any therapeutic power, except such as is more markedly exhibited in quinia, unless the cincho-tannic acid, which is a powerful astringent, and upon which the astringency of the cinchona bark depends.

Of the various official forms, the pale bark and its tincture may be tried where the stomach is very sensitive to quinia. The yellow bark is decidedly astringent.

The decoction of yellow bark is an inelegant and unstable preparation, though, perhaps, the favourite. The infusion is by far the best form in which to administer cinchona elegantly and cheaply. It contains a higher per centage of alkaloids than any other preparation in proportion to the amount of bark used. The liquid extract is much too concentrated, and never contains the true equivalent of the amount of bark used in its preparation.

The tincture of yellow bark, in tea-spoonful doses, is a very proper way in which to order cinchona.

Quinia may be given in powder, pill, mixture, or solution. When a large dose (say 10 to 20 grs.) is to be given, by far the best way is for the physician to order it to be taken in wafer-paper; 20 grs. may be folded up in a disc of moistened wafer-paper, and swallowed like a spoonful of soft food, without the least inconvenience.

It is not necessary, as is often supposed, to order quinia in solution; the acid of the gastric juice causes it to be speedily dissolved and admitted into the blood; and the following agreeable, though not very attractive, formula may be used, and will not be found so bitter as a *solution* of the alkaloid:—

℞.

*Quiniæ Sulphatis gr.* xxxvj.
*Syrupi Aurantii* ℥j.
*Tincturæ Aurantii* ℥j.
*Aquæ ad* ℥xij. *misce.*

*Fiat mist. cujus cpt. ℥ss. ter in die ante cibos, phiala priusquam agitata.*

Tannic acid is found by some to cover the taste of this drug.

℞.

*Quiniæ Sulphatis gr.* xxxij.
*Glycerin. Acid. Tannici.* ʒvj.
*Syrupi Aurantii Fl. ad* ℥iv. *misce.*

ʒi. *ter in die, p. p. a. ex aqua.*

Arsenic often increases the antiperiodic effects of quinia.

℞.

*Liq. Arsenic. (Fowleri)* ʒj.
*Infus. Cinchonæ* ℥viij. *misce.*

*Fiat mist. cujus cpt. ℥ss. ter in die post cibos.*

The tincture of quinia, in teaspoonful doses, is an agreeable and effective way to administer small quantities. Quinia, when ordered in solution with the acid infusion of roses, makes a slightly turbid mixture, while if dilute nitric acid be employed to make the infusion a beautiful preparation results.

The combination of bark with a mineral acid cannot be more effectively produced than in the following excellent tonic:—

℞.

*Tinct. Cinchonæ Flav.* ℥iss.

*Spt. Chloroformi* ʒiv.

*Ac. Nitro-Mur. Dil.* ʒiv.

*Syrupi Aurant. ad* ℥iv. *misce.*

*Fiat mistura, cujus capiat cochlear.* i. *minim. ex paululo aquæ ante cibos.*

**Cinnamomum** is a warm aromatic, acting as a true stomachic by a gentle stimulating action on the gastric membrane, increasing its secretion and assisting digestion; hence its use as a condiment. It contains a small quantity of astringent principle, which renders it more useful in diarrhœa than a mere flavouring ingredient, and sometimes it is of use in pulmonary hæmorrhage. It also contains some principle grateful to the stomach, which often assists it in overcoming nausea, or even sea-sickness. The essential oil is a stimulant, and 5 minim doses will relieve flatulent distention, and a smaller quantity corrects the griping of purgatives.

**Coccus**—The cochineal insect and its preparations are simply colouring agents, there being no reason to think that tincture of cochineal has any effect whatever in whooping-cough or other spasmodic affections. Its beautiful carmine colour is turned purple by alkalies.

**Colchicum** in small doses is absorbed, and by the blood is supplied to the different glands in connection with the gastro-intestinal canal, which it excites to increased activity, and these effects are produced either by its introduction under the skin or into the stomach; the gastric juice and pharyngeal mucus are increased, and the bile augmented (its salts being more plentiful), and marked increase in the intestinal fluid ccurs. In larger doses, vomiting, purging, tenesmus, and in- mmation result, and death occurs from irritant poisoning.

As a diuretic its action is most uncertain, and as a purgative its effects are too severe. Well-marked sedative influence on the heart and general circulation follow its administration.

It is as a remedy for gout that colchicum is used in medicine, and often very wonderful effects follow its administration, pain subsiding promptly, swelling disappearing, and the attack often vanishing after one or two full doses. Some, however, believe that it is in no way curative, the relief being dearly bought, the pain returning with greater severity.

How it acts in these cases of acute gout it is not, in our present knowledge, possible to answer; but we know it is not by exerting its purgative or questionable diuretic properties, since its good effects are constantly seen without either catharsis or diuresis being produced.

Paris noticed that alkalies softened its action, while acids rendered the drug more irritating.

Magnesia makes a favourite corrective. The wine of colchicum is the best preparation for ordinary administration.

It has been advocated in all the protean forms of gout, or in almost every disease occurring in gouty persons, and often it is beneficial. In these cases, and in chronic gout, small doses —15 minims of the wine—may be given every 6 hours. The same plan may be adopted in the acute variety of the disease, though it is better to give a full dose—say 1 dram—of the wine, and repeat it in two, three, or four hours while pain lasts. In acute rheumatism its utility is very doubtful.

Colchicum, from its stimulating effects upon the liver, may be given advantageously with other purgatives, and a few grains of blue pill and colocynth make a very valuable purgative for gouty patients, combined with ½ to 1 grain of extract of colchicum.

The following is a modification of Scudamore's white mixture:—

℞.

*Vini Colchici* ʒvj.

*Magnes. Sulph.* ℥j.

*Magnes. Carb.* ʒij.

*Aquæ M. Pip. ad* ℥xij. *misce.*

*Fiat mist. sumat cochlearia duo ampla quartis horis. p. p. a.*

℞.

*Ext. Colchici Acet. gr.* ¾.
*Pil. Hydrarg. gr.*iiss.
*Pil. Colocynth. Co. gr.*iiss. *misce.*

*Fiat pil. mitte tales* xii., *st.* i. *h. s. pro re nata.*

**Collodium and Collodium Flexile** are only intended as external applications. When a little is brushed or dropped upon the skin the ether evaporates, leaving behind a thin film impervious to moisture. This contracts as it becomes more solid, until it puckers up the surrounding skin, and, by its pressure, partially empties the vessels of the part. It is generally used as a protective coating for fresh wounds, excluding air and all external sources of irritation, putting the wound almost in the same condition as an internal part, thus hastening repair. It is, however, used for its contractile properties some times, as in the treatment of small nævi, port-wine marks, entropion, &c., where it both diminishes the blood in the cutaneous vessels and gives firm support. Taking advantage of this contractile property, Dr. MacKeown has proved its great efficacy in relaxed membrana tympani.

The flexile collodion does not contract so much as the other, but it is much less liable to crack with the movements of the skin. It is an excellent application to erysipelatous surfaces. Corrigan recommended it as a remedy for nocturnal incontinence of urine, painted over the child's prepuce at bed-time; and it has been successfully used to cover the face in small-pox to prevent pitting, and as an application to fissured nipples. Nowhere, however, are its good effects so strikingly seen as in the treatment of scalp wounds—incised, lacerated, and contused—as it dries, by its contractility it draws the edges of the wound together, prevents the admission of air, and does away with the necessity of a bandage.

**Colocynthis** is an active purgative, causing copious watery motions. It is easily absorbed; enters the blood, from which it is eliminated by the intestinal glands, which it stimulates, increasing their secretion, and hastening the vermicular contractions of the bowel, making them painful and irregular. In large doses it acts as a violent irritant to the canal, and may excite fatal inflammation or disturb the functions of the abdominal organs by reflex action, and thus produce abortion, &c. It is seldom given alone, on account of its drastic properties, but is a valuable addition to aloes and scammony.

Extract of hyoscyamus greatly relieves the griping caused by colocynth, without detracting from its purgative properties. The compound pill is a valuable purgative in constipation of long standing. Its action, like aloes, is most decided on the colon, and (in full doses) on the liver.

℞.

*Pil. Colocynth. Co. gr.*iv.

*Ext. Hyoscyami gr.ss.*

*Ext. Belladonnæ gr.* $\frac{1}{8}$.

*Resinæ Podophylli gr.* $\frac{1}{4}$. *misce.*

*Fiat pil. mitte tales* xii. *st.* i. *nocte, p. r. n.*

**Conium**—The effects of this drug have been carefully studied, and the researches of Fraser demonstrate that the discrepancies in the results of the various observers are owing to the presence of methyl compounds of conia in the different preparations experimented with.

Hemlock has no effect upon the intellectual faculties, if we exclude the blunting of common sensibility, sometimes noticed in poisoning by this remedy; the heart is not affected, and respiration is influenced only by poisonous doses, which cause death by paralysing the respiratory centre.

The physiological effects of hemlock begin to show themselves within half an hour after swallowing half an ounce or an ounce of the succus. Vision becomes a little affected by a paralysing influence upon the third nerve, which causes slight drooping of the lid, slight dilatation of the pupil, and impaired movement of the eyeball, followed soon by general diminished motor power, as is seen in a wearied, unsteady gait. If a larger dose be now administered the diminution of motor power is intensified, and the patient is unable to move, the knees bend on standing, the pupil becomes more markedly dilated (though it is never widely so), and vision gets more confused.

Still larger doses being given, complete paralysis of the muscles ensues, swallowing and phonation become impossible, and finally death occurs from asphyxia, through paralysis of the respiratory apparatus. The cord is not affected except in fatal doses, and then probably only when some methyl compound of conia is taken.

The primary action of conium upon the system is by *paralysing the extremities of the motor nerves.* The muscles, wher directly stimulated by electricity, contract readily, showing that it is the nervous supply that is paralysed, not the contractile tissue, and the sensory nerves are not affected.

Dr. Harley maintains that all these effects are produced by the action of conium upon the motor centres, especially the *corpora striata*, and afterwards upon the motor centres of the cord, this latter only when dangerous doses are administered.

These marked physiological effects of conium clearly point to the cases in which the drug will be useful in disease; and hence it has been used by Harley and others in chorea, its value depending on its depressing influence over the motor centres, or on the extremities of the nerves distributed to the restless muscles. In whooping-cough it is also serviceable, and marked benefit follows its administration in acute mania and tetanus, where it acts as a direct *sedative*.

In spasmodic affections, like laryngismus, and convulsions occurring during dentition, hemlock may be advantageously given; but unless in all these cases administered very freely, it is worthless. The extract rarely possesses any power at all, and the only reliable preparation is the succus, which should be given in doses of 2 to 6 drams every three or four hours, and little benefit may be expected till the physiological effects of the drug are noticeable—as slight disturbance of vision and gait. Ringer gave 7 drams hourly to a choreic child; and children can bear large doses well as a rule. A child one year old should get more conium in proportion than an adult; 10 minims to begin with is a maximum dose of the succus. It should, however, be rapidly increased, watching the effects. When any difficulty of swallowing is observed, the use of the drug should be suspended. Hemlock possesses undoubted power sometimes in causing the absorption of effused inflammatory products; and formerly it was classed on this account as a *solvent*, *deobstruent*, or *absorbent*, and it probably possesses this power through its influence on the nervous system. Clinical experience at present fails to give any insight into the cases in which it is safe to expect this action from the drug.

☞ *Antidote.*—Emetics, the use of the stomach-pump, free stimulation, and, as a last resource, the hypodermic injection of strychnia.

**Copaiba**—After reaching the stomach, copaiba acts as a mild irritant to the mucous membrane, and in large doses excites nausea, vomiting, griping, purging, and sometimes strangury, with bloody urine. It seems to act upon mucous membranes only, and it is mainly for its effect upon the lining of the urinary tract, especially its urethral part, that it is used in medicine.

Given in gonorrhœa, it at first slightly increases the flow, and afterwards controls it. The exact way in which it accomplishes this is not quite certain. It would almost seem that it acts by destroying the specific poison which causes the inflammation. It is eliminated by the kidneys, and slightly by the skin, both of which excretory organs are stimulated by it, and during its excretion it comes in direct contact with the diseased membrane. It increases the watery element in the urine, and is used sometimes as a diuretic in dropsies of hepatic origin, as in ascites from cirrhosis.

That it acts by direct contact in gonorrhœa and gleet is probable, because the writer has found great benefit from injecting it into the bladder in inveterate cystitis in the female. He dilutes it with its own bulk of warm castor oil, and injects 1 oz. of it, allowing it to remain until expelled. In acute inflammations of the bladder, or urethra, copaiba often aggravates if given too early. If warm-water injections be used for two or three days at first, copaiba will be found more effective afterwards. It should not be given in larger doses than 30 minims, and often this dose upsets the stomach.

In chronic bronchitis with profuse expectoration, copaiba often acts splendidly, and will be found in such cases the most reliable of the oleo-resins. It is occasionally used in leucorrhœa, and has been found to remove psoriasis, which resisted all remedies. It should be remembered that its administration sometimes brings out a profuse rash not unlike measles, or urticaria, and this probably gives some explanation of its use in psoriasis, acting as a stimulant to the skin. It may be given alone, in water, in the form of an emulsion with mucilage, egg, or liquor potassæ, or in a gelatine capsule, or in a paste, or pill with enough carbonate of magnesia to give the required consistency, and flavoured with oil of cloves or peppermint.

*(Gonorrhœa Mixture.)*

℞.

*Copaibæ* ʒvj.

*Liq. Potassæ* ʒiij.

*Mucilaginis* ℥j.

*Spt. Æther. Nit.* ʒiij.

*Aquæ Cinnamomi ad* ℥viij. *misce.*

*Fiat mist. capiat cochlear.* i. *mag. ter in die. p. p. a.*

**Coriandrum**—An aromatic carminative, identical in its effects with Anethum and Anisum (under which heads its action is explained). 4 minims of the oil may be given on sugar, for colic.

**Creasotum** possesses many properties in common with Acid. Carbolic. (which see). It is speedily absorbed on entering the stomach, and does not undergo any marked change in the blood. It is eliminated by the bronchial mucous membrane, which it stimulates, thus becoming a valuable expectorant, especially if there be anything fetid about the secretion. It also passes off by the urine, and is believed by some to be a diuretic, though this action is only to be relied upon in doses which are bordering upon dangerous. In very large doses, it is a violent irritant poison, resembling carbolic acid, only nervous symptoms—as paralysis, convulsions, and coma—are more marked.

Small doses have a sedative action upon the terminal nerve filaments distributed to the gastric mucous membrane, and correct nausea, gastralgia, and vomiting, whether caused by local mischief or of a reflex character, as in sea-sickness or pregnancy. 2 or 3 minims frequently arrest fermentative and putrefactive changes in the stomach, for creasote, like carbolic acid, is a powerful antiseptic. It may be given in pill or in a mixture, and it is to be remembered that it explodes when combined with oxide of silver in the pilular form, unless it is previously diluted with some inert powder. Externally, it acts like carbolic acid, and relieves the pain of an exposed dental nerve effectually; and in the form of the ointment it is useful in ulcers and the scaly skin affections where tar is indicated, and it relieves the itch of eczema. As an inhalation in chronic bronchitis and gangrene of the lung creasote is very beneficial.

☞ *Antidote.*—After the use of the pump, glycerine may be employed to wash out the stomach, and demulcents should be freely administered afterwards.

℞.

*Creasoti min.* xij.

*Pulv. Sapo. Castil. gr.*xv.

*Micæ Panis. gr.*xxx. *misce.*

*Divide in pilulas* xii. *e quibus sumatur una ter in die.*

Creasote may be elegantly ordered in the fluid form.

℞.

*Creasoti.* ʒj.

*Tinct. Aurantii* ℥ij.

*Glycerini ad.* ℥iv. *misce.*

*Fiat mist. st.* ʒi. *ter in die ex paululo vini Xerici.*

**Creta and Creta Præparata** are mild antacid remedies, useful where we wish to reach the *intestinal* surface with an alkali. (Their action is explained under Calcium Carbonate.) The aromatic powder is a valuable remedy in the diarrhœa of childhood; it may be given as a powder or in a mixture.

*(For a Child four years old.)*

℞.

*Pulv. Cretæ Aromat.* ʒij.

*Syrupi Simplicis* ℥j.

*Spt. Chloroformi* ʒj.

*Aquæ ad* ℥ij. *misce.*

*Fiat mist. sumat. cochlear.* i. *minim. tertiis vel quartis horis, p. p. a.*

**Crocus**—Saffron may be said to be only used now for its colour and flavour. It was much esteemed long ago as an emmenagogue, and was believed to possess the property of increasing the rash in the exanthemata, and was classed amongst stimulants. It probably possesses some faint action on the skin.

**Crotonis Oleum** is a powerful drastic or irritant cathartic, causing copious watery motions often in less than one hour after a medicinal dose. It does not act entirely as a local irritant to the intestines, as was supposed, but is absorbed, and entering the blood, circulates with it till it reaches the intestinal glands, which it stimulates to increased action, and it quickens the peristaltic movements. The same effects follow its application to the skin with friction, as are observed after swallowing it. In large doses it is a violent poison, acting as a local irritant, and causing inflammation of the digestive tract, or death from collapse. Its rapid and generally certain action renders it a valuable purgative, where time is a consideration, as in head injuries and brain diseases, and in very obstinate constipation, when we are sure the lower bowel is freed by enemata. It may be given in pill, 1 minim frequently acting as an efficient cathartic; or in apoplexy, it may be dropped on the tongue, when power to swallow is blunted or lost. (This is not, however, to be recommended.) It may, in such a case, be rubbed up with about 5 gr. of sugar, and placed on the root of the tongue, when it generally finds its way down; or it may be mixed in ordinary cases with castor oil.

Externally, croton oil is a strong irritant when applied to the skin, bringing out an eruption, at first papular, but soon passing into pustulation. It is not, however, as painful a counter-irritant as might be expected from the amount of inflammation of the skin following its use. The linimentum crotonis cannot be improved upon, where the drug is indicated as a rubefacient.

☞ *Antidote.*—There is no antidote; the treatment should be the same as for ordinary irritant poisoning—demulcent drinks, with opium freely given, and soothing enemata administered.

℞.

*Olei Crotonis m.* iv.

*Pulv. Glycyrrhizæ gr.*xxx. *misce.*

*Ft. pil.* viii. *st.* i. *sextis horis ad effectum.*

*(Or in a case of Acute Mania or Apoplexy.)*

℞.

*Olei Crotonis m.* ij.

*Sacchar. Alb. gr.*viij. *misce.*

*Signa, "To be placed far back on the tongue, and washed down with a teaspoonful of water."*

**Cubeba** resembles Copaiba in its action, and possesses a stimulating and alterative influence over the genito-urinary mucous membrane and rectum. Its use is confined to the early stage of gonorrhœa. Made into a paste with copaiba, and a little nitrate of potash added, it can be bolted in wafer paper in doses the size of a hazel nut, when it will be found the best routine treatment for this disease. The same paste will often give relief in bronchitis with profuse expectoration, when other measures fail; and it is an excellent remedy for piles, if made into a paste with *glycerine*, and bolted in a similar way.

℞

*Pulv. Cubebæ* ℥ij.

*Pulv. Potassæ Nit.* ʒij.

*Copaibæ q.s. ut. fiat.*

*Electuarium*, ʒi. *ter die sumend.*

**Cupri Sulphas** given in small doses (⅓ grain) acts somewhat like the lead and silver salts. It has nervine tonic properties, and has been given in epilepsy. It is a strong astringent, and is used in chronic diarrhœa. In larger doses (5 to 10 grs.) it is a speedy emetic to be relied upon in formidable poisoning cases, and in still larger doses, it is a powerful irritant poison.

Externally, it is a valuable astringent, appreciated in veterinary practice, and the powder dusted over sluggish sores destroys unhealthy granulations, and is a powerful local stimulant. 3 grs. to 1 oz. water makes a lotion which may be applied to chancres and ulcers; or injected into the urethra in gleet; or into the vagina in leucorrhœa; or brushed over the lids in ophthalmia tarsi.

Its prolonged administration stains the gums with a blue line like that seen in cases of lead-poisoning. It is eliminated by the skin, kidneys, and bowel, and may be found for a long time in the liver, in considerable quantity, after its medicinal use.

☞ *Antidote.*—Yellow prussiate of potash, egg-albumen, and milk, form insoluble compounds with copper salts.

**Cusparia** is a tonic possessing aromatic and febrifuge qualities. It acts somewhat like cinchona, and is reputed, like it, to have the property of reducing the temperature. In large doses it causes vomiting and purging, but in medicinal doses (30 grs. of the powder) it is useful in the fevers of the tropics, and in the dysentery of our own country, though it is almost devoid of astringency. Its value is seen in the treatment of some cases of intermittent fever where cinchona or its alkaloid cannot be borne.

**Cusso** when taken in large doses sometimes causes both vomiting and purging. It efficacy in medicine, as a remedy for *Tænia solium* and *bothriocephalus* does not depend upon this action, for in the doses usually given it does not often purge, but kills the parasite by direct contact.

2 to 4 drs. of cusso infused in 4 oz. of boiling water, and swallowed without straining, are taken for one dose; and, like many other vermicides, it acts more certainly if given when the stomach and intestines are empty, and if followed soon after by a mild purge; the worm is expelled dead, and often in small fragments.

**Digitalis**—A great deal has been written upon the action of digitalis, but the student had better confine his attention to those effects of the drug upon the heart, about which most experimentalists agree. Thus, it has been demonstrated that it is a valuable cardiac stimulant and tonic, greatly strengthening the pulsations, giving power, and at the same time slowing each contraction of the ventricle, diminishing the rate of the pulse, and raising arterial tension. These effects, though unmistakably marked in the case of persons with weak or diseased hearts, are by no means clearly seen when digitalis is administered to a strong healthy man. Indeed, Dr. Harley believes that this remedy in medicinal doses may be found to weaken the healthy heart. Large doses cause great cardiac irregularity and weakness, and still larger doses will kill by causing excessively rapid and feeble contractions, soon followed by complete arrest.

How digitalis exerts this tonic and strengthening influence over a diseased heart can hardly be said to be understood. Some suppose it is through its action on the inhibitory vagus. Thus Traube believes the vagus and cardiac ganglia are both stimulated by moderate doses; others, amongst whom are Dybkowsky, believe that it only acts upon the cardiac ganglia; whilst several experimentalists consider it acts directly upon the muscular elements of the heart.

Dr. Brunton concludes that the resistance offered by the contracted arterioles (for digitalis contracts all the smaller arteries) goes some way in explaining the slowing effects on the heart, though the vagus, doubtless, is stimulated. More recent experiments, however, would lead us to suppose that the arterioles are contracted by digitalis, through its influence over the vaso-motor centre.

A poisonous dose, before it arrests the action of the heart, dilates the arterioles, and causes the arterial tension to fall. The rise of the arterial tension is considered by Professor Boehm to be owing to the increased work done by the heart,* in addition to the narrowing of the vessels.

---

* Wirkung der Arzneimittel auf das Herz und die Blutgefässe.

Digitalis, on account of this strengthening action on the heart, may be given in all cases of weakened contraction from valvular disease, except one. It acts, as suggested by Foster, in valvular diseases by slowing the heart's movements, so that the overburdened ventricle or auricle gets longer time to contract, and thus more effectually drives the blood through a narrowed orifice. In the case of mitral obstruction the time during which the blood flows from the distended auricle into the ventricle is increased, and when the former contracts it has less to expel, and hence does its work better. The exception to its use is in the early stage of aortic regurgitation, where, after each contraction of the heart, the blood, which should be forced along the aorta, finds its way back into the wearied ventricle, breaking upon its repose. If the diastole is prolonged by digitalis, the duration of this backflow is increased, and the mischief aggravated. Later on, however, when the pulmonary circulation is affected, and through it the right ventricle becomes implicated, digitalis may afford relief. It should not be given in extensive atheromatous disease of the vessels, nor where there is much fatty degeneration of the heart muscle. Ringer points out that "the irregularity of the pulse is the capital indication of the necessity of giving digitalis," and it is often valuable in palpitation and irregular action of the heart not depending upon valvular disease.

It has been highly recommended in delirium tremens in half-ounce doses of the tincture, where its sedative effects (apparently owing to changes in the cerebral circulation from the arterioles being diminished in calibre) have been in the hands of some followed by good results. This plan will not be adopted by the discreet physician unless all others fail, especially as this is a disease in which a sudden wind-up occurs without warning. It sometimes decidedly reduces the temperature in inflammatory conditions, and as an anti-pyretic is used largely on the Continent. Liebermeister, in Ziemssen's Handbook, recommends about 10 to 20 grs. to be administered in 24 to 36 hours, and he states that the anti-pyretic effect is more certain when the administration of the digitalis is not spread over too long a time. At the end of about 36 hours he gives large doses of quinia. It is a strange thing that digitalis as an anti-pyretic is less indicated the higher the pulse is. Professor Binz* attributes its action to the effect produced upon the circulation through the skin, and not to any true specific effect upon the fever poison.

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* International Congress, August, 1881.

Digitalis has been recommended in internal hæmorrhages, because of its contracting influence upon the arterioles, but it is very uncertain. It has decided power in causing the contraction of the uterine muscular tissue, and may be used in menorrhagia.

As a diuretic, digitalis takes a high place, but it does not produce diuresis on the eliminatory principle. It simply increases the flow of urine by raising the blood pressure within the glomeruli, and the experiments of Brunton demonstrate this. By increasing the dose he raised the blood pressure so high that the secretion of urine stopped entirely, and as it began to fall the urine commenced to flow again. In disease the diuretic effects of this drug are often astounding. Given to relieve the kidneys, where many quarts or even gallons of fluid are shut up in the peritoneal cavity or thorax, from an obstructed cardiac circulation, it has been seen to increase the scanty urine from several ounces to as many pints in twenty-four hours. In these cases it clearly acts by striking at the cause of the dropsy.

It is a remarkable fact, that when the dropsy disappears, digitalis ceases to have any direct diuretic action, and it then fails to increase the amount of water, or urea, excreted by the kidneys.

Externally, an infusion applied to any extensive surface is readily absorbed, and will often effectually act as a diuretic, and will relieve urgent bronchial suffering depending upon heart disease.

As regards the *cumulative* action of digitalis, much doubt exists, some believing that the drug has the power of storing itself up in the system, and manifesting its presence by rather sudden explosions. This may probably be accounted for by the tardy way digitalis does its work in the system; as, for example, Traube finds it only reduces the body heat after being swallowed for a period of 2 days; hence it is probable that when given in large or small doses, with a sufficiently long interval, no cumulative action will be noticed.

The best form in which to give digitalis and watch its effects is to prescribe the Pharmacopœial infusion, freshly made (3 grs. to 1 oz.), without any admixture, in half-ounce doses.

The tincture in doses of 10 to 60 minims may be employed where the infusion is not convenient. For dropsy of cardiac origin, in the form of Guy's pill, we have the most valuable known diuretic. Digitalinum is seldom used.

☞ *Antidote.*—After emetics, the stomach pump, and free stimulation whilst in the horizontal position, atropia, $\frac{1}{60}$ gr. may be injected under the skin.

*(Guy's or Baly's Pill—modified.)*

℞.

*Pulv. Digitalis*

*Pulv. Scillæ*

*Pil. Hyd. ana gr.*j. *misce.*

*Fiat pil. mitte tales* xx. *st.* i. *ter in die.*

*(Dr. Fothergill's Pill.)*

℞.

*Pulv. Digitalis gr.* ½.

*Ferri Sulph. Exsic. gr.* ¼.

*Pulv. Capsici gr.* ⅔.

*Pil. Aloes et Myrrhæ gr.*ij. *misce.*

*Fiat pil. mitte tales* xx. *st.* i. *bis in die.*

Tinctures of digitalis and iron go well together, notwithstanding they are so-called incompatibles; the iron is invaluable in combating the anæmia so common in heart affections.

**Dulcamara**—A worthless incumbrance to the Pharmacopœia, proved by Harley and Garrod to be devoid of any physiological power. It was supposed to be a feeble narcotic.

**Elaterium and Ecbalii Fructus**—The latter is only used to prepare elaterium, which is the most violent purgative known. Belonging to the hydragogue class, it produces profuse watery evacuations by its stimulating and irritating action on the liver and intestinal glands, by which it is eliminated, and it produces its effects when inserted under the skin. Externally, it is a strong irritant when applied to a moist surface.

In the treatment of desperate conditions—like apoplexy, &c. —⅙ to ¾ grain will draw off as much water and serum from the blood as a copious blood-letting. The ⅙ grain is a good average dose, and, owing to the discharge of water produced by it, it is invaluable in dropsies, or in accumulation of fluids from any cause, especially where the kidneys are congested or fail to do their office, and the heart is not too weak. Its great use lies in its application to cases of formidable and sudden anasarca, threatening life by its rapidity, as in œdema of the lung. 3 grs. of the compound powder, put on the root of the tongue and washed down with a spoonful of water, will purge in a few hours.

☞ It is a deadly poison in doses of two or three grains or upwards, the treatment being demulcents, with opium and stimulants.

**Elemi** is a mild stimulant when applied externally, causing feeble inflammatory action in the skin. The ointment may be used as a dressing for indolent and sluggish ulcers, but is seldom ordered by the surgeon.

**Emplastra**—The plasters of the Pharmacopœia are chiefly used for their physical qualities of adhesiveness. By strapping so that a hold can be obtained on the surrounding elastic tissues, considerable pressure can be constantly kept up, and in this way inflammatory products may be absorbed, especially if of syphilitic origin, the ammoniacum and mercury, or the mercury plaster, answering this end well. Pain may be relieved by the belladonna or opium plasters, while feeble counter-irritation and active rubefaction may be produced by calefaciens and cantharides. Adhesive plaster is the name given to the resin preparation. With the exception of cantharides, all the plasters promote the absorption of superficial inflammatory deposits by protecting the part from variations of temperature. By checking evaporation the local temperature is increased, and the superficial part partakes somewhat of the benefits of an internal position, and glandular and lymphatic action become altered in some way, as is seen in the resolution of chronically inflamed glands and joints.

**Enemata.** (See Page 247.)

**Ergota**—After its absorption, ergot causes contraction of the involuntary muscular fibre throughout the body, the coats of arteries and veins diminish rapidly in calibre, and the vessels of the spinal cord are more especially contracted; hence it has been successfully used in some forms of paraplegia. Dr. Harley believes ergot causes contraction of involuntary muscle by its indirect action through the sympathetic system, but the balance of evidence is decidedly in favour of its direct action on the muscular tissue. The heart is scarcely affected, but the uterus is powerfully influenced, and the arterial tension being raised in the glomeruli of the kidney, ergot acts as a diuretic, and at the same time assists the contraction of a weakened bladder.

Ergot is invaluable in internal hæmorrhages, 20 minims of the liquid extract every three hours relieving hæmoptysis by constringing the small vessels. In *urgent* cases the same amount may be injected under the skin every fifteen or thirty minutes. It is useful in all hæmorrhages, and sometimes, by acting upon the muscular wall of the intestines, it stops diarrhœa. The hypodermic injection of ergotine has proved effectual in curing aneurisms when injected into the tissue surrounding the sac, and in the same way it diminishes fibroid tumours of the uterus, and it has been recommended in purpura and excessive sweating.

It is, however, in obstetric practice that the virtues of ergot are appreciated. By acting upon the uterine fibres it produces powerful contraction, and expels the contents of the organ. Half-dram doses of the bruised fungus, infused for ten minutes in boiling water and swallowed without straining, will often arouse the slumbering energies of the uterus within five or ten minutes, but its administration requires discrimination; thus, it should not be given if there be any impediment to the descent of the head, or if the pains are already good; and sometimes it exerts its toxic effects upon the child.

It is apt to cause irregular action of the muscular tissue, and often is the cause of retained placenta. It seems to act proportionately to the size of the uterus. In the early months of pregnancy it fails to affect the organ, but its power over it increases with every month of gestation. It is the best remedy we have for the relaxed condition causing *post-partum* hæmorrhage, where it may be given in dram doses, or it may be injected under the skin. The obstetric practitioner may find the infusion prepared upon the spot more troublesome, but he will have much more uniform and satisfactory results from it than if he employed the fluid preparation. Where the medical man resides a long way from his patient, it is a good rule to never leave a recently delivered case without previously giving a dose of ergot. Good results follow its use in sub-involution and menorrhagia, and various forms of uterine fibroid tumours.

Large doses excite vomiting and diarrhœa, and may cause death. Dry gangrene and desperate spasmodic muscular contractions often follow its prolonged use. 3 grs. of ergotine may be injected at one time, but an unsightly dark-coloured scar often remains. (See Page 220.)

**Farina Tritici**—Wheaten flour, in the form of bread, is too well known as a valuable food to require mention. It is used in medicine as an external application in erysipelas, where it acts as a simple protective by excluding the air and keeping up an even temperature. With water it forms an emollient poultice. A tablespoonful of flour swallowed in a tumblerful of cold water, morning and evening, will often check the growth of boils.

**Fel Bovinum Purificatum**—A remnant of the older pharmacy, not often used now. It is employed in medicine where there is reason to suspect that the natural secretion of bile is deficient, and bile is known to assist the emulsification of fats, to act as an antiseptic and purgative, and to facilitate the absorptive powers of the mucous membrane. It may be given in 30 gr. doses as a bolus, or wrapped in wafer-paper.

**Ferrum**—Iron must to some extent be considered as a food, but if given in medicinal doses it cannot be so regarded. In health it has no power to increase the number of the red corpuscles, as recent experiments prove. It increases the appetite somewhat, and if the astringent preparations be administered constipation results; in any case, the stools are black, and sometimes the bladder is irritated. None of these effects throw any light upon the action of the drug in disease, which is, beyond all doubt, a most valuable tonic to the whole system. It directly affects the blood in anæmia, increasing the red corpuscles, and thus enriching nearly all the tissues with an increased supply of oxygen. The brain and nervous system benefit by this; their tone rapidly improves, and hence its great value in exhaustive mental overwork, and neuralgia, where iron is a tonic in the true sense of the word.

In recovery from fevers, especially in cases where there has been *much brain activity* or *prolonged delirium*, the use of iron is often attended with almost marvellous results. How iron produces its effects (in anæmic conditions) on the blood is not clear. It is supposed to act by entering into the lymphatic glands, and stimulating them, thus encouraging the transformation of lymph corpuscles. This is anything but probable, since hyper-activity of these structures does not produce a condition the opposite of anæmia. Reasoning from physiological grounds, it would seem that *iron produces its effects in the liver;* and the disordered state of this organ, often observed when iron is administered in persons of markedly bilious temperament, is not opposed to such a theory, which, however, should only be regarded as a possibility in the absence of any proof.

The soluble salts of iron are absorbed, probably in large amounts, and are, after passing through the liver, eliminated by the intestinal tube, passing out by the fæces in almost as large amount as when swallowed.

The action of iron is too often regarded as merely restorative, supplying to the blood a scanty constituent; but iron most probably acts by improving the assimilative powers, the headquarters of which are probably seated in the right hypochondriac region. There are some observant physicians who think that the acid in which the mineral is dissolved plays no mean the effect produced by iron. The best results follow the administration of large doses of the tincture. It would occupy much space to mention the ailments for which iron is so highly praised, but many will be included by saying that in anæmia, from whatever cause, this drug may be freely given. It seems to possess specific power over erysipelatous inflammations when taken in large doses, and in chlorosis and scrofula its effects are nearly as evident.

Externally, the perchloride is a powerful astringent, and the strong solution acts upon the blood-vessels, and hardens the tissues. It is a valuable last resource when injected into the uterus in *post-partum* hæmorrhage, if reduced to about the strength of the diluted solution of the Pharmacopœia.

The scale preparations are favourites, especially the citrate with quinia, which, however, cannot be ordered with alkaline carbonates.

℞.

*Ferri et Quiniæ Cit.* ℨij.
*Spirit. Chloroformi* ℨiv.
*Inf. Calumbæ ad* ℥x. *misce.*

*Fiat mist. st. cochleare* i. *mag. ter in die.*

The citrate may be given in effervescence, and makes a most elegant and palatable chalybeate mixture.

℞.

*Ferri Ammon. Cit.* ℨij.
*Acid. Citric.* ℨii*ss.*
*Aquæ Destil. ad* ℥vj. *misce.*

*Fiat mist. st. coch.* i. *mag. ter in die cum coch.* ii. *mag. mist. alkalin. dum effervescent.*

*(Alkaline Mixture for the above.)*

℞.

*Potassæ Bicarb.* ℨv.
*Spt. Chlorof.* ℨij.
*Aquæ ad* ℥xij. *misce.*

*Signa, "Alkaline Mixture."*

**The tartarated iron may be ordered with an alkali.**

℞.

*Ferri Tartaratis* ʒj.
*Syrupi Aurant. Flor.* ℥j.
*Potassæ Bicarb.* ʒiss.
*Infus. Calumbæ. ad* ℥x. *misce.*

*Fiat mist. capt. cochlearia duo ampla ter in die.*

*Iodide of Iron*—This compound will be found invaluable in struma and syphilis, and the syrup is well suited to the taste of children.

*(For a child two years old.)*

℞.

*Syrupi Ferri Iod.* ʒiij.
*Syrupi ad* ℥iv.
*Olei Limonis gt.* iv. *misce.*

*Fiat mist. capt. coch.* i. *min. ter in die.*

The pill of iodide of iron, as ordered in the Pharmacopœia, is objectionable on account of its instability. Blanchard's pill, about the same strength, is decidedly superior.

*Tinct. Ferri Perchlor.* is, perhaps, the best and most used preparation of iron. It cannot be given with alkalies or their carbonates.

℞.

*Tr. Ferri Perchlor.* ℥j.
*Glycerin.* ℥j.
*Aquæ* ℥ij. *misce.*

*Fiat mist. st.* ʒi. *ex* ℥i. *aquæ ter in die post cibos.*

Glycerine is the best corrective to order with the liquid iron preparations, and makes a much more agreeable mixture than if spirit of chloroform is used, though the latter prevents the iron from causing any gastric irritation, and is sometimes retained when the stomach rejects more elegant combinations.

The following is an excellent mixture:—

℞.

*Liq. Ferri Perchlor.* ℥j.
*Pot. Chlor.* ℥*ss.*
*Spt. Chlorof.* ʒiij.
*Aquæ ad* ℥x. *misce.*

*Fiat mist. st.* ℥ss. *ter in die post cib. ex aqua.*

℞.

*Tr. Ferri Perchlor.* ℥j.
*Tr. Calumbæ* ℥ij.
*Glycerin.* ℥j.
*Aquæ* ℥ij. *misce.*

*Capt. coch.* ii. *min. ex coch.* i. *mag. aquæ quater. in die post cibos.*

The liquor may be ordered in a similar way. The old London Pharmacopœia tincture is a decidedly better preparation than the British.

The syrup of phosphate of iron is useful in the dyspepsia of anæmic patients. It should be ordered by itself.

℞.

*Syr. Ferri Phosph.* ℥iv.

*Capiat* ʒii. *ex. paul. aquæ ter in die.*

The *Mistura Ferri Co.* has long maintained its supremacy amongst the iron preparations as a remedy for absent or scanty menstrual discharge. If its position is well deserved, it is certainly by producing the maximum of good with the minimum of iron, as it is often in a decomposed condition before being swallowed by the patient.

The ***Mist. Ferri Aromat.*** is seldom ordered. Though an inelegant, it is a valuable chalybeate, and the same may be said of Tr. Ferri Acetatis.

The ***Saccharated Carbonate*** is a very agreeable mode of giving iron; and Neligan gives the following as a mild astringent in infantile diarrhœa:—

℞.

*Ferri Carb. Sacch. gr.*xxx.
*Pulv. Myrrhæ gr.*xxiv.
*Pulv. Cinnam. Co. gr.*xxx. *misce.*

***Divide in partes æquales*** **xii.,** ***quarum sumatur una ter in die.***

The ***Sulphate*** is a good tonic and astringent, and is a valuable addition to purgatives.

℞.

*Ferri Sulph. Exsic. gr.*iss.
*Mannæ gr.*iss.
*Ext. Aloes Socot. gr.*ij. *misce.*

***Fiat. pil. mitte tales*** **x.** ***sumat*** **i.** ***om. nocte.***

Or,

℞.

*Ferri Sulph. gr.*xx.
*Mag. Sulph.* ℥ij.
*Syr. Zingib.* ʒvj.
*Inf. Calumbæ ad* ℥x. *misce.*

***Fiat mist. sumat cochlearia duo ampla tertiis horis ad effectum.***

If a plain chalybeate is required without astringency, in the Ferrum Redactum such will be found.

℞.

*Ferri Redacti gr.*iv.

*Mannæ q.s. ut*

*Fiat pil. mitte tales* xx., *st.* i. *ter in die post cibos.*

**Ficus**—The fig is nutritious, and acts as a mild laxative. When taken in large quantities it causes griping, probably by the presence of the indigestible fruits, or so-called seeds, irritating the mucous membrane, and setting up irregular and painful contraction. Split open and heated, figs make a popular emollient poultice.

**Filix Mas**—The liquid extract of male fern is the best remedy for *tænia solium* and *bothriocephalus.* It should be given to an adult in half dram doses, early in the morning, after a previous castor oil purge administered at bed time, to insure the complete emptiness of the bowel. Care should be taken to look for the head of the worm, for until this is obtained there is doubt of its destruction. The fern seems to act as a direct poison to the parasite, though Harley thinks it merely acts by causing such powerful reflex contraction of the intestinal tube that the worm is torn from its moorings and expelled. The writer, from watching its effects in children, finds that a smaller dose combined with turpentine acts more efficiently than when the extract is given alone, and the worm may be expelled without purgation.

℞.

*Ext. Filicis Liq. m.* xx.

*Spt. Terebinth.* ʒss.

*Ovi Vitelli* i. *misce.*

*Et adde*

*Aquæ et Syrupi q.s. ad* ℥ij.

*Fiat haustus, mane sumend.*

**Fœniculi Fructus**—Fennel acts like Anethum (which see). In addition to its aromatic qualities, it is supposed to have the power of increasing the flow of milk. The water is a favourite antispasmodic for infantile colic, in teaspoonful doses for a child one year old.

**Galbanum** resembles assafœtida closely in its action, only it is feebler in every respect. Externally, the plaster is a mild stimulating application to indolent glandular enlargements; it acts probably by influencing the superficial lymphatics to take on more vigorous functions.

**Galla**—Since the value of galls depends upon the tannic and gallic acid contained in them, the reader is referred to Acid. Gallicum.

**Gentianæ Radix** is a simple bitter tonic. Its mode of acting on the system is the same as that of Calumba, (which see.) It has been supposed to exert some slight stimulating effect upon the liver. Few remedies will give such good results in the vomiting of pregnancy, as the mistura, combined with a mineral acid; it will often stop retching when all other remedies fail, and it is a feeble laxative.

℞.

*Mist. Gentianæ* ℥viiss.

*Acid. Mur. Dil.* ʒiv. *misce.*

*Fiat mist. cpt. cochleare* i. *mag. ter in die ex paululo aquæ.*

**Glycerinum**—on account of its solvent and undrying properties—is used extensively in Pharmacy. Internally, it is nutrient, and has been substituted for cod-liver oil; but there is no proof that it possesses any of the valuable properties of this drug. It acts in some manner (in passing down the canal or in its elimination) upon painful and inflamed piles, and soothes them in a way which no other remedy does. It may be used to sweeten the unsavory food of diabetics, and in large doses is laxative. Its hypodermic injection has produced symptoms like strychnia, and probably when swallowed only a little of it finds its way into the blood.

Externally, it is very soothing and emollient when applied to the skin, but occasionally, when undiluted, it acts as a strong irritant. It has been recommended in every form of skin disease requiring emollient treatment. By keeping the part to which it is applied continually soft it cures fissures and prevents excoriations; with borax it forms the most satisfactory application to chapped nipples and stomatitis, and can be used in the aphthous state so common about the genitals of badly cared for female infants and children. It prevents bed sores. Applied on cotton-wool to the os uteri, and kept in contact with the cervical glands it causes a copious watery discharge, diminishing rapidly any congestion which may be present.

Applied to the mouth and throat it relieves the distressing dryness of these parts in prolonged feverish states; often by its emollient effect upon the throat it relieves reflex cough and irritability of the fauces. It may be given for hæmorrhoids, in teaspoonful doses, to which a little chiretta or nux-vomica is added to destroy its intense sweetness. Glycerine is a powerful antiseptic, a ten per cent. solution in water preserving animal substances from decay; it is a good solvent for Salicylic Acid, many alkaloids, and neutral salts. Squire recommends a solution of 15 grs. isinglass in 1 oz. glycerine for various skin diseases.

**Glycyrrhiza**—Liquorice—is supposed to have demulcent properties, and is used to relieve cough and promote expectoration. Any effect it has in this way is probably owing to reflex action, and its ciliary-exciting qualities are greatly inferior to even Gum Arabic (which see). It is chiefly used for its pleasantly sweet taste. The fresh root seems to be slightly laxative. The fluid extract covers the unpleasant taste of many nauseous drugs, and the compound powder is only of value on account of the senna it contains.

**Gossypium**—Cotton Wool—is employed for its physical qualities—softness, elasticity, &c. It affords a protective covering for burned and blistered surfaces, and is largely used in surgical practice as a padding for splints, and in rheumatic fever as a covering for the inflamed joints. The writer has found it to act most beneficially in phlegmasia dolens, applied in a *thick* layer over the entire limb, and most completely surrounded with mackintosh, or oiled silk, and bandaged carefully so that the natural moisture cannot get out through any chink.

**Granati Radicis Cortex**—Pomegranate Root Bark—is a valuable astringent in the dysentery and diarrhœa of hot temperatures. In larger doses, it kills the tape worm, and 2 oz. of the decoction, repeated every four hours for four doses, and followed by a brisk purge if necessary, will prove a good remedy for this troublesome parasite. The drug itself acts in large doses as a cathartic.

**Guaiacum** once held a high position as a remedy for syphilis. It is now believed to have little or no action in this disease, and it is not much used. The only effect certainly known to follow its administration is that of a mild diaphoretic. It seems to have some power in relieving the wearying pains of chronic rheumatism, and it was an important constituent in the famous "Chelsea Pensioner" — an electuary consisting of the following—and found useful in the rheumatic and gouty complaints of old people :—

℞.

*Guaiaci Resinæ* ℥j.

*Sulphur. Sublimat.* ℥ij.

*Pulv. Rhei* ℥*ss.*

*Pulv. Sinapis* ℥ij.

*Pot. Nitratis* ℥*ss.*

*Mellis vel Theriacæ q.s.* *misce.*

*Fiat electuarium, st.* ʒi. *mane nocteque.*

The ammoniated tincture of guaiacum has been strongly recommended in acute tonsillitis in half dram doses in sherry. It will, however, often be found to aggravate the condition of matters considerably in this affection.

**Gutta-Percha** is only used for its physical qualities; a solution in chloroform making a protective covering, like collodion, for excoriations, and it is employed to prevent pitting in small-pox. Coloured with a little chalk or calamine, this solution is useful when painted over the sutured line, instead of plaster, after *post-mortem* examinations. When neatly applied, the line of incision is hardly noticeable.

**Hæmatoxyli Lignum**—Logwood is a valuable astringent and tonic, acting like tannin. The extract, which is a hard solid, when dissolved in water will be found the most certain and reliable astringent in the diarrhœa of tubercular ulcerations, acting often when everything else disappoints, and it is well suited to the inveterate diarrhœas of childhood.

℞.

*Ext. Hæmatoxyli* ʒii*ss.*

*Tinct. Opii m.* lxxx.

*Mist. Cretæ ad* ℥iv. *misce.*

*Fiat mist. cpt. coch.* ii. *min. post singulas dejectiones liquidas.*

**Hemidesmus** is supposed to act like sarsaparilla. It is a feeble stimulating diaphoretic, and is used as a remedy for syphilis in India. Probably the fresh plant has some power, for the dried herb seems to have very little. The syrup is used as a flavouring ingredient in cough mixtures.

**Hirudo**—Leeches are used to extract blood in local inflammations, and good healthy specimens may be calculated to remove two drams each. It is a good plan to apply them when possible over such prominences as will permit of gentle pressure being applied in case of excessive hæmorrhage from their bites. In applying leeches they should never be touched by the fingers of the nurse or attendant. The dispenser should be directed to send them in a chip box, which should only be opened as the affected part is exposed; and the inversion of the box (which should be steadily pressed against the skin till they fasten) is all that is generally necessary. The part should be very clean, and free from all traces of soap, mustard, &c. If the leeches refuse to bite, which is seldom, a little sugar or cream, or, better still, the minute scratch of a needle determines the point. If leeches are to be applied over a large surface, several boxes may be used; a 2 oz. box holds one dozen. They should not be pulled off after their feast, but should be allowed to drop. If, however, it is necessary at any time to remove them before their meal is completed, a little salt sprinkled over their backs acts as a brisk emetic, and they drop off at once.

Should further bleeding from the bites be required, a hot poultice or fomentation may be applied, or a cupping-glass may be put on over the bites; this is an excellent plan. A pad of wool or gentle pressure with the fingers will easily restrain the hæmorrhage; but occasionally perchloride of iron must be used, or even a hare-lip needle, with a figure of 8 thread, may be required. Matico leaf will, however, answer all purposes when applied with moderate pressure.

The extraction of blood by leeches should not be recommended in severe or extensive inflammations, for if the system is to be affected it can only be by opening a large aperture and *rapidly* removing a fair quantity of blood in a short time. Space prevents a consideration of the arguments for and against the practice of blood-letting, but the writer has no doubt that by the *absolute* rejection of venesection, therapeutics loses a valuable remedy. He has twice seen life apparently flow in as the blood ebbed out. It is in cases of engorgement of the pulmonary vessels, following severe chest injury, and threatening imminent suffocation, that by boldly striking into a large vein life will be saved. The writer has followed this course in a hopeless case of submersion, where death was apparently rapidly approaching. The systemic veins and pulmonary circulation were engorged, and the burdened right ventricle threatened momentarily to cease its almost ineffectual contractions. By making a *free* incision into the median basilic the inspirations became gradually slower, and the heart, eased by the relief to the systemic circulation, commenced to beat strongly, the patient appeared to be suddenly snatched from death, and made a speedy recovery. In such cases death would probably have occurred from suffocation, even had the patient's body been covered with leeches.

**Hordeum Decorticatum**—Pearl barley is a nutritious food. It is introduced into the Pharmacopœia for the preparation of the decoction, which makes an agreeable demulcent drink in febrile conditions, and serves to dilute cow's milk for bottle-fed children.

**Hydrargyrum**—Mercury, when given in large doses in the metallic state, acts as a purgative by mechanically driving all matters before it, owing to its weight; but if any should remain in the sacculations of the intestine for a sufficient time till the juices of the bowel would render it soluble, the constitutional effects of the metal would soon show themselves.

Inhaled as a vapour, the metallic mercury is active; swallowed in a minutely divided state, or rubbed into the skin, or injected hypodermically, mercury and its salts produce marked constitutional effects. If only a minute quantity be administered, and for a short time, there will be increase in the number of the red blood corpuscles, a general improvement in the circulating fluid, and an increase in body weight. (These effects are evident when very *small* quantities are given to domestic animals.) If the minute doses are indulged in for a longer period, or if the quantity is increased, the blood loses in fibrin and red corpuscles, and becomes charged with excess of waste products; a brassy taste is felt in the mouth; the gums swell and are marked with a blue line; the teeth are tender; the salivary secretion is increased; and fetor of the breath is noticed. The spongy gums soon ulcerate; the salivary glands enlarge; and, as the metal is eliminated, it stimulates all the glandular apparatus—cutaneous, salivary, intestinal, and renal—by which it is thrown out; nervous tremors and disorders of co-ordination appear; emaciation, prostration, and finally death will occur. These symptoms are much the same after the administration of any mercurial preparation in small doses.

Calomel, mercurial chalk, or blue pill are the preparations administered when we wish to get the physiological effects of mercury; the red iodide and corrosive sublimate being violent irritants, causing death, like irritant poisons. The salts of mercury are dissolved in the stomach or intestines, and find their way into the blood as albuminates, and in their passage out exhibit their remarkable selective action, chiefly on the salivary glands, and it is supposed also on the pancreas.

Exaggerated ideas of the dangerous results of mercury upon the system have arisen, probably because in disease the use of the drug has been generally pushed too far. We know now that it is entirely unnecessary to produce the above effects in order to treat a disease by mercury, and it is evident to those who closely watch the effects of mercury upon children, that they will improve and grow fat upon it even for a long time, if judiciously administered.

Internally, mercury has been generally given (1) to control acute inflammations, or, (2) to cause the absorption of inflammatory products, or, (3) to combat the poison of syphilis.

There are, moreover, various groups of symptoms for the dispersion of which mercurials are used. The diarrhœa and obstinate vomiting of children often yield to minute doses—$\frac{1}{10}$ gr. of calomel every hour. A group of symptoms, known popularly as biliousness in the adult, is frequently dispersed by a good dose of calomel or blue pill, which, by removing all sources of irritation in the intestines, relieves an over-loaded liver, or remedies a catarrhal condition of the bile ducts.

Much dispute has arisen out of the action of calomel upon the liver, and recent experiments prove, what had been surmised, that calomel acts as a purgative—not by stimulating the liver to secrete more bile—but, by irritating the duodenum, so that the bile is swept down the canal before time is allowed for its absorption into the intestinal blood vessels. There is thus really less bile circulating with the blood after a dose of calomel (which causes free purgation) than there was before. Few now advocate the use of mercury in acute inflammations, excepting in the case of iritis, and it is seldom employed to cause the absorption of effused products, though it is strongly maintained by a few that it controls meningitis, and assists the absorption of fluid effused within the cranium. In meningeal inflammations of a tubercular nature, after effusion has occurred, if the system be *rapidly* brought under the influence of mercury, such improvement often immediately follows as to lead one to believe that a partial absorption of fluid had resulted. It is hardly necessary to say that it has no effect whatever in arresting the disease, and the symptoms again increase in severity. But in *simple* meningitis the writer has been fortunate enough to witness such unmistakable results as satisfied him of the power of mercury in assisting the absorption of effused inflammatory products inside the cranium.

In typhoid fever, large doses early in the disease are believed by many Continental physicians to curtail its course.

***Mercury in Syphilis***—Even here the virtue of mercury is doubted, but the authority of Hutchinson is decidedly in its favour, as is that of most observers; and it is probable "that mercury is a true vital antidote to the syphilitic poison, and is capable of bringing about a real cure." The same high authority just mentioned believes that many cases of indurated chancre treated early by mercury, never show any of the characteristic symptoms of the secondary stage, and when these do appear they are milder than in cases where the mercury had not been used.

Mercury has, however, not only no action on the soft spreading sore, but its administration is injurious. In true indurated chancres, the mercurial should be commenced as soon as possible, and continued till thickening and induration melt away. Ptyalism and the other constitutional effects of the drug should never be produced, but small doses of the non-irritant preparations—calomel, grey powder, or the green iodide as recommended by Record—should be steadily administered, and their use instantly suspended upon the appearance of changes in the gums or on increase of saliva being observed. One grain of calomel, with quarter this quantity of opium; or one grain of blue pill, or grey powder morning and night; or $\frac{1}{12}$ grain of corrosive sublimate twice a day; or 5 grs. of Plummer's pill, three times daily will be found enough.

After mercury fails to produce its effects when given by the mouth it may be introduced into the system by *inunction*, as advised by Sigmund; about half a dram of the ointment being rubbed into the skin night and morning; it often brings out a troublesome eczema. The *hypodermic* method is equally objectionable, a painful swelling, with suppuration, often following the puncture, while the plan of *fumigation* with a spirit lamp and calomel is both troublesome and uncertain. On the first sign of the constitutional effect of mercury upon the system the dose should be diminished or suspended for a few days. Those who believe that mercury is useless in the secondary stages of syphilis have not, perhaps, administered the remedy for a sufficiently long period, since sometimes the patient must continue to take it for two or three years before the poison is eradicated from the system.

In congenital syphilis there is no preparation equal to grey powder, which may be given freely, as mercury in moderate doses seems incapable of doing harm whilst there is a large amount of the syphilitic poison for it to expend itself upon. Weak, emaciated infants bear larger doses, when poisoned with syphilis, than they can when afterwards apparently cured and fattened; but if, after a period of neglect, syphilitic symptoms come on markedly, then they bear very large doses again. A child one year old may get ½ grain of grey powder three times a day for three days, then ½ grain every night, and this may be continued as long as the infant thrives. If no result seems to follow, a little of the ointment may be rubbed in occasionally.

The corrosive sublimate is the most poisonous of the mercurial compounds, and Dr. Harley brings evidence to show that it acts as a heart poison.

☞ *Antidote.*—Albumen, given freely with water. The white of one egg neutralises about 4 grs. of the salt.

Gluten, flour, or milk may be advantageously used also.

The following is a convenient form for administering mercury:—

℞.

*Hydrarg. cum Creta gr.*iiss.

*Pulv. Doveri gr.*ij. *misce.*

*Fiat pil. secundum artem. mitte tales* xxiv. *st.* i. *bis in die.*

Or,

℞.

*Hydrarg. Perchlor. gr.*ij.

*Potassii Iodidi* ʒij.

*Aquæ Destill.* ℥xij. *misce.*

*Fiat mistura, st. ℥ss. ter in die post cibos.*

Externally, *Ungt. Hydrarg.* is used to produce the constitutional effects of mercury upon the system, by being rubbed into the skin. The following are a few of the uses of the different mercurial ointments of the Pharmacopœia which are applied for their local action:—

*Ungt. Hyd. Subchlor.*, diluted with half its weight of lard, possesses the power of relieving the painful itching of various eczematous conditions about the genitals and anus; it is a valuable application to *all* indolent syphilitic skin diseases, and rarely causes salivation.

*Ungt. Hyd. Ammon.* acts as a poison to vermin, and readily destroys pediculi and their ova, and is used to kill the parasites which cause tænia, &c.

*Ungt. Hyd. Co. and Liniment. Hyd.* are used as substitutes for Scott's dressing. Spread upon lint, and applied with pressure around diseased joints and glandular enlargements, they are useful by stimulating the lymphatics.

*Ungt. Hyd. Iod. Rub.* is an active rubefacient, seldom used in this country except in veterinary practice, but is a powerful remedy for goitre in India, when aided by the rays of the sun.

*Ungt. Hyd. Nitratis* (citrine ointment), diluted with twice its weight of lard, is the best application in the scaly stage of eczema. It acts as a stimulant, and in some way alters the action in the diseased skin, often after every other remedy fails. It is invaluable in inveterate ozæna, when diluted with glycerine and brushed inside the nose.

*Ungt. Hyd. Ox. Rub.*, diluted with eight times its weight of lard, or preferably, an ointment of the yellow oxide (8 grs. to 1 oz.), is an invaluable stimulant and alterative in obstinate eczema of the eyelids, and is identical with "golden ointment."

*Lotio Hyd. Nig. and Flav.* are stimulating applications to various chancroid and other sores of a specific origin. Their efficacy in these troublesome complaints leads one to suppose that they act by destroying the syphilitic poison as they come in contact with it.

*Liq. Hyd. Nitratis* is a powerful caustic, especially indicated in the treatment of syphilitic warty growths and scrofula derma.

A solution of the perchloride (3 grs. to 1 oz.) is used to destroy the parasite of various skin diseases.

**Hyoscyami Folia**—This drug affects the system like belladonna, producing delirium, dryness of the mouth, dilatation of the pupil, and sleep. It differs from it in being more decidedly hypnotic and less stimulating to the heart, and in possessing a sedative influence over the urinary mucous membrane as it is being eliminated by the kidneys. Dr. Harley has shown that small doses are sedative and tonic to the heart; large doses excite it, while excessive doses depress it; hence its usefulness in cardiac asthma and excitement of the heart from valvular lesions. In all the spasmodic affections in which belladonna is useful, hyoscyamus may be employed. In inflamed and irritable conditions of the bladder it is the best remedy we possess. The active principle of the drug is a mild diuretic, and in passing out of the system, exerts its sedative influence upon the terminal nerves of the irritated membrane; and it is especially indicated when the bladder is contracting frequently to expel small quantities of urine unnecessarily. In these cases it may be advantageously combined with alkalies. It seems to increase the narcotic effects of opium, and its alkaloid hyoscyamia promises well in acute mania.

Children bear enormous doses of hyoscyamus, whilst the aged are seriously affected by even small quantities. It corrects the painful griping of purgatives, and relieves the pain of internal neuralgic affections. The juice in teaspoonful doses is the best preparation.

℞.

*Tr. Hyoscyami* ʒvj.
*Pot. Bicarb.* ʒiv.
*Spt. Chloroformi* ʒiv.
*Aquæ ad* ℥viij. *misce.*

*Fiat mist. st. coch.* i. *mag. quater. in die ex paul. decoct. hordei.*

**Iodum** externally, is a valuable counter-irritant, weak solutions causing mild rubefaction, while strong preparations, like the liniment, will cause vesication, and even leave an unsightly scar. There can be little doubt that very weak solutions (half the strength of the tincture) are absorbed when applied to the skin, and finding their way into the tissues stimulate the absorbent vessels, and thus aid the removal of glandular swellings and local effusions. The liniment applied in its strength, is found to cause changes of position in the corpuscular elements under the skin, but any effect produced by it is not owing to its absorption, but to its counter-irritant qualities. It has been found useful in chronic glandular enlargements, in various painful affections of the thoracic nerves and muscles, and painted in the neighbourhood of small local inflammations it often arrests the suppurative process. The liniment will also destroy the parasites which cause tænia and other skin complaints.

One part of the tincture in fifty of water is used to wash out cysts in which putrefactive changes are going on; and diluted with an equal bulk of water, or alone, the tincture is injected into the serous cavity surrounding the testicle in order to excite adhesive inflammation and work a radical cure in hydrocele. Iodine is a powerful antiseptic.

The vapour of iodine is used for inhalation in chronic suppurative bronchial affections. The tincture, by the method of parenchymatous injection, is invaluable when injected by the hypodermic needle into *solid* bronchoceles, enlarged lymphatics, and various glandular growths. (15 minims each time will be be enough.)

Internally, iodine in the free state is not often used, most authorities believing that iodide of potassium possesses all the properties of the metalloid. The writer believes that it is much inferior to iodine in the treatment of scrofula, and the result of recent observations in Canada promise to put tincture of iodine almost on an equal footing with quinia as a remedy for malaria.

Since *Iodide of Potassium* is the form in which iodine is generally prescribed internally, its use will here be referred to. Given to a healthy man, iodide of potassium, in small doses (⅓ gr.), improves the appetite, and increases the weight of the body. It is rapidly absorbed, and probably remains as iodide of sodium in the blood; and if the dose is increased, and taken frequently, a characteristic group of symptoms are developed, to which the name of *iodism* is given. A brassy taste is felt in the mouth, the amount of saliva is increased, and there soon appear signs of irritation of the mucous membrane of the eyes, nose, throat, and bronchial passages, resembling an ordinary catarrh, with swelling of the eyelids; the brows and teeth ache; eruptions like acne, purpura or urticaria appear; appetite fails, nausea and diarrhœa come on; waste increases, causing emaciation, debility, and a sinking feeling at the bottom of the sternum; sexual power is destroyed, and the urine becomes increased in amount, and tuberculosis may supervene. All the glandular organs of the body seem to be stimulated to increased activity, and the drug has been said to cause wasting of the mamma and testicle. In some, the symptoms of iodism cannot be produced, as patients have been known to take one dram of the iodide of potassium daily for several months or years. It is eliminated by the kidneys, salivary glands, bronchial membrane, and mammary glands.

This remedy will be found to counteract many pathological conditions, though in several its *modus operandi* is very mysterious. It is invaluable in many scrofulous states, causing the absorption of various effused unhealthy products, either by increasing the activity of the absorbents or by rendering such products more fluid. In this latter way it acts upon the secretion of chronic bronchitis, and thus becomes one of our best expectorants. The products of pleuritis, pneumonia, and pericarditis often yield to moderate doses (5 grs.), and it is the best remedy for the early stages of cirrhosis of the liver and lungs.

In large doses (20 grs. and upwards) iodide of potassium has been used for the treatment of internal aneurisms beyond the reach of surgery; and the writer has seen one case of aortic aneurism completely cured, under the care of Professor Cuming, by large doses of the iodide, the patient afterwards dying from tubercle of the lung; the sac was found perfectly solid. How the remedy acts in such cases it is difficult to see. It is probably by its alteration of the physical qualities of the blood, leading to fibrinous deposition and solidification.

☞ In chronic metallic poisoning, the iodide of potassium, entering the blood, meets with the albuminates of mercury or lead stored in the tissues, and by forming soluble salts, which are eliminated, the system is purged of the poisons.

In a somewhat similar way iodide of potassium may combine with the specific poison in tertiary syphilis and decompose it. Its power over nervous lesions, the result of syphilitic deposit, is rapid, certain, and lasting; gummata melt before its influence, and bony enlargements of a specific origin are often speedily reduced; but it must in such cases be pushed boldly in doses of 20 to 40 grs. The same effect is occasionally noticed as was mentioned about mercury in congenital syphilis —*i.e.*, after the apparent destruction of the specific poison the system is less tolerant of the drug. It appears to possess little influence over the earlier stages of syphilis. The pains of rheumatoid arthritis are often benefited by the judicious administration of the iodide, and it speedily relieves bronchial asthma depending upon simple catarrh. It acts occasionally as a powerful diuretic when other remedies fail, but it is uncertain, and must be given in very large doses.

The treatment of hydrocephalus by iodide of potassium has many advocates, and though it appears to have some control over the amount of fluid poured out, still, evidence is not forthcoming to prove that it has any curative influence over this formidable affection.

Half a grain, with ten minims of hippo wine, is a valuable tonic given after food. Ammonia increases the effect of iodide of potassium, and when the dose exceeds a few grains it should never be given to a fasting patient.

☞ *Antidote*—In a case of chronic poisoning, by iodide of potassium, with alarming prostration, the writer, availing himself of the salivary channel by which the drug is known to pass from the system, caused the patient to chew pellitory root for several hours, and upon the secretion of a very remarkable amount of saliva, containing the iodide, rapid improvement followed. In poisoning with free iodine, lime water and starch or flour may be freely given.

In Chapter VIII. (PHARMACY) will be found the description of a method by which 6 grs. of the iodide can be ordered in a pill.

℞.

*Potassii Iodi.* ʒiv.

*Tinct. Calumbæ* ℥j.

*Spt. Ammon. Ar.* ʒiv.

*Aquæ Destill. ad* ℥vj. *misce.*

*Fiat mist. cpt. cochl.* ii. *min. post cibos ex aqua ter in die.*

Or,

℞.

*Linim. Iodi* ℥j.

*Liquor. Potassæ q.s.*

*Ad saturat. ferme st. min.* xxx. *ex cyath. aquæ ter in die post cibos.*

The following will be found the best form for ordering iodine for external application:—

℞.

*Linimenti Iodi.*

*Tincturæ Iodi ana* ℥j. *misce.*

*Fiat applicat. mane nocteque utend.*

**Ipecacuanha**—Hippo was formerly employed as a counter-irritant, owing to its power of producing a pustular eruption. It has entirely given way to other more convenient and certain rubefacients. The active principle *(emetine)* is a powerful poison. Large doses of the powdered root cause vomiting by stimulating the medullary centre, which presides over the complex act of vomiting, and this effect is produced either by the hypodermic injection of the alkaloid or by its internal administration. Its emetic action is too slow to be of use in poisoning, but is highly beneficial in croup and bronchitis in children. In smaller doses (½ gr.) ipecacuanha acts as a direct stomachic, increasing the vascularity of the stomach and promoting the flow of gastric juice, and, combined with the same quantity of iodide of potassium, we have one of the best remedies for atonic dyspepsia. Still smaller doses, Ringer affirms, will cure the vomiting of various conditions, as pregnancy, alcoholism, migraine, &c. He gives the wine (1 minim) every hour. This plan has signally failed in the hands of many. In larger doses (3 or 5 grs.) the powder acts as a diaphoretic, but is uncertain unless when combined with opium—as in Dover's powder—and it is remarkable that the combination is so efficacious, only a grain of either remedy being in each dose, while much larger quantities of each, separately, are so uncertain. In diaphoretic doses, hippo also acts very markedly upon the bronchial mucous membrane, causing free secretion of thin mucus; hence, in disease it is one of the best expectorants we possess. The increased tough secretion of chronic bronchitis is thus rendered more fluid, and comes up with greater ease to the patient; whilst in acute attacks the dry inflamed membrane is soon covered over with a moist secretion after the administration of full doses. In winter-cough there is no remedy more efficacious, and a spray of equal parts of the wine and water has been most successful in Ringer's hands in various bronchial ailments.

The writer, in conjunction with Dr. Workman, made a series of experiments on the action of various remedies upon the cilia of the bronchial mucous membrane. Though a weak solution of ipecacuanha succeeded oftener and more effectually than any other remedy in restoring the movements after their cessation, the results were far from satisfactory or conclusive; and, whilst they seemed to show the *possibility* of this action of ipecacuanha in the human body, it was found impossible to arrive at any definite conclusion without the aid of more elaborate experiments and vivisection.

In speaking of ciliary excitants under "Acacia" the probability of medicinal substances assisting expectoration by their influence upon the cilia was referred to. Indeed, a study of the structure of the ciliated epithelial cell would show that it is hardly possible for the activity of the cell itself to be markedly increased without the cilia participating. Thus Klein and other authorities have demonstrated the substance of the epithelial cell (which was formerly regarded as mere granular protoplasm) to be nothing more or less than an exquisitively fine net-work of fibrillar elements, with a varying hyaline interfibrillar substance. The cilia, according to the above-named authority, are the prolongations of the fibrils of the intracellular net-work, projecting through the thin membrane covering the free cell border, and he considers it possible that the ciliary motion is caused by the contraction of the network. Future investigation may show that this net-work is directly continuous or connected with the nerve filaments distributed to the mucous surface.

Ipecacuanha has been given in nauseating doses in various hæmorrhages with uncertain success. On the liver this remedy acts as a powerful stimulant, and it slightly increases the intestinal secretion.

In dysentery, in the acute stage, ipecacuanha possesses powers which are deemed almost specific; it should be given in doses of at least 20 to 60 grs., and the stomach seldom rejects it, if absolute rest be enjoined and liquids sparingly swallowed. The wine is often a very uncertain preparation, but a favourite remedy in the bronchial affections of infancy. It has some influence over whooping-cough; as an emetic the wine may be given in teaspoonful doses every 15 minutes to a child one year old, or 5 minims may be administered every hour in bronchitis.

(*Fothergill's Dinner Pill.*)

℞.

*Pulv. Ipecacuan. gr.*j.
*Acid. Arsenios. gr.*$\frac{1}{20}$.
*Pulv. Pip. Nig. gr.*ij.
*Pil. Aloes et Myr. gr.*iiss. *misce.*

*Fiat pil.* "The same dose of strychnia may be substituted for the arsenic." Above is an excellent fillip to the digestion.

**Jalapa** is a powerful hydragogue cathartic, acting probably entirely by its *local* irritating effects upon the intestine, as injection of its active principle into the circulation appears to have no effect upon the bowel. It must come in contact with the bile to be efficacious; the extract and resin produce considerable pain and griping; the compound powder will be found the most satisfactory form for giving the drug, and it is especially in anasarca and ascites that it is indicated. It may be given in dram doses stirred up in a tumbler of water, or swallowed dry in wafer-paper. The resin possesses the great advantages over the root in being less bulky and less nauseous, and may be given in 4 gr. doses, in pill.

**Juniperi Oleum**—A mild stimulant and stomachic in small doses. It rapidly enters the blood, and is picked out by the kidneys, which it powerfully stimulates, carrying with it increased quantities of water if dropsy exist, while in health it may even diminish the quantity of water. It excites the genital organs, and seems to resemble cantharides when given in very large doses, as strangury and priapism have been known to follow its use. The spirit makes a good addition to diuretic mixtures.

**Kamala** is a cathartic, two drams speedily producing copious evacuations; it is, however, only used for its destructive action upon the *tape* worm, killing it, and afterwards causing its expulsion. It will in a like way destroy lumbracoids. 1 to 2 drams should be taken suspended in mucilage or gruel, and, if necessary, a purgative should follow its administration.

**Kino** is a powerful astringent, containing nearly ¾ of its weight of tannin; it acts like it, and is useful in diarrhœas, hæmorrhages, or wherever the effect of tannin is desirable. The compound powder is an excellent form in which to administer the drug, combining with the astringency of kino the narcotic effects of opium. It closely resembles in its action both catechu and krameria.

**Kousso.** (See Cusso.)

**Krameria**—Rhatany is a valuable astringent and tonic, resembling kino in its action, and it has long enjoyed the reputation of being a useful local application to fissured anus. About 5 grs. of the extract and ¼ gr. morphia made into a suppository with coccine affords the most elegant method of using the drug, and a teaspoonful of the tincture in a wineglassful of water makes a valuable wash for spongy gums; or the following may be used :—

℞.

*Tincturæ Krameriæ*
*Tincturæ Myrrhæ*
*Tincturæ Cinchonæ Flavæ*
*Tincturæ Kino ana* ℥j. *misce.*

*Fiat mist.* ʒi. *ex* ℥i. *aquæ utend. pro lot. oris mane nocteque.*

**Lac**—Milk is introduced into the Pharmacopœia for making scammony mixture, and in addition to its nutritive qualities it is especially indicated as a diet, where it is desirable to diminish as much as possible the bulk of the fæces. Externally it is emollient, and may be used with much advantage as a soothing injection in inflamed conditions of the vagina and lower part of the neck of the uterus. It is a good vehicle in which to administer camphor and quinia.

☞ It should be used to wash out the stomach in poisoning with corrosive sublimate and sulphate of copper.

**Laricis Cortex**—Larch Bark is a weak astringent containing tannin, and possesses some power in diminishing the profuse secretion of chronic bronchitis. On being eliminated by the bronchial mucous surface it is, like turpentine, very useful in hæmorrhage from this membrane. It is beneficial in purpura with tendency to bleeding, acting probably by its astringent effect upon the capillaries.

**Laurocerasi Folia**, though often used as a mere flavouring ingredient, contain prussic acid, and possess, when taken in sufficient doses, all the powerful sedative properties of that drug. The amount of acid in the aqua varies so constantly that it is impossible to rely upon it. A teaspoonful often contains a fair dose, but cherry laurel produces no effect which is not also more certainly and uniformly achieved by prussic acid.

**Lactuca**—Lettuce has been introduced as a substitute for opium. It does produce feeble narcotic results, acting like this drug, but its effects are so uncertain that it could be well dismissed from the Pharmacopœia as unnecessary. Its active principle—lactucarium—may be taken in 10 gr. doses, and possesses fair diuretic powers.

**Lavandulæ Oleum** acts as an antispasmodic, like the following; it is, however, seldom used except as a perfume, and the tincture is prized as a colouring ingredient, and is introduced into Fowler's solution, which undoubtedly would be much better without it. Five minims of the oil on sugar will rapidly relieve colic, and it can be given with advantage in combination with cajuput.

**Limonum**—The oil and rind of the lemon are used in medicine only on account of their flavour, though in 5 to 10 minim doses the oil is a valuable remedy in painful and irregular contractions of the intestinal tube caused by accumulations of gas from fermenting food.

The fresh juice is the most successful treatment for scurvy, and a certain preventive. How it acts is still a mystery, but apparently it produces its good effects by supplying to the blood something in which it is deficient, and upon the absence of which in the diet the scurvy depends. It has been supposed that this missing element has been potash or phosphoric acid, but further light on the subject is necessary. The juice is largely used as a refrigerant drink in all febrile conditions.

As a remedy for scurvy 5 oz. daily, and as a prophylactic on long sea voyages 1 oz. daily should be administered. Given in effervescence with alkaline carbonates the urine is rendered alkaline, as the salt passes out again as carbonate.

The quantity of each carbonate necessary to saturate a tablespoonful of fresh lemon juice will be found in the section on Materia Medica under Acid. Citric., and in this form many remedies can be administered when the stomach will tolerate nothing else, the carbonic acid acting as a direct sedative to the irritated gastric nerves. Iron is very elegantly ordered in this way. (See page 301.)

**Linum**—Flaxseed contains a mucilaginous principle, which it yields to boiling water, and which acts as a soothing demulcent when it comes in contact with the gastro-intestinal mucous membrane, protecting it from irritating secretions. It has reputed expectorant qualities, which probably entirely depend upon its action on the throat as it passes through on its way to reach the stomach. Large doses of the infusion act as a diuretic by mildly stimulating the kidneys, and a patient with an irritable bladder often finds relief from it. The poultice affords the best medium for applying a continuous moist warmth to local inflammations; it relieves tension and promotes resolution, whilst, if matter has already formed, it will meet with less difficulty in working its way to the surface through the softened tissues. The oil is laxative, but is seldom given except as an enema. Externally, it is a favourite application to burns, when made into an emulsion with lime water, constituting "Carron Oil."

**Lithium**—The carbonate and citrate of this element act like the corresponding salts of potash and soda, over which they possess the great advantage of being less caustic, and of forming much more soluble salts with uric acid. The urate of soda, which exists so largely in the system in gout, is converted into the more soluble urate of lithium, which acts as a diuretic as it is eliminated by the kidneys. This result follows the use of either the carbonate or citrate, the latter being changed into the former in the system; and a solution of the carbonate (1½ dr. to 1 pint) has been found useful by Garrod for removing the chalky deposits of gout. The prolonged administration of lithium salts will dissolve uric acid calculi in this way; hence they are called lithontriptics.

The effervescing liquor is the most agreeable form for administering the drug. 10 grs. may be taken in this way each day.

**Lobelia** when taken in large doses excites vomiting, depresses and finally paralyses the respiratory and cardiac centres, and causes intense prostration and complete muscular relaxation, acting, like tobacco, as a powerful narcotico-acrid poison. It has been highly praised in bronchitis and asthma; in the former disease, however, it is most uncertain and disappointing; in the latter it occasionally affords marked relief.

Ringer recommends dram doses of the tincture every hour; but very often serious depression and sickness follow these doses, and it may be said that lobelia only produces its beneficial antispasmodic effects when a dose bordering upon danger has been administered. Small doses prove very useful in relieving spasm of the bowel caused by fæcal accumulations. It has been used in whooping-cough. It increases the action of the skin and kidneys, acting as a diaphoretic and diuretic.

☞ *Antidote.*—Very active stimulation after the evacuation of the stomach. Ether, ammonia, and strychnia may be then injected.

℞.

*Tr. Lobeliæ Æther.* ʒvj.

*Spt. Ammon. Aromat.* ʒiv.

*Chlorodyni* ʒj.

*Syrupi Simpl. ad* ℥ij. *misce.*

*Fiat mist. cpt. coch.* i. *min. tertiis horis p.p. a.*

**Lupulus**—Hop is a valuable stomachic, increasing the vascularity of the gastric membrane, aiding digestion and prompting appetite, and, by its slight narcotic effects, it promotes sleep in various irritable or delirious conditions, either when taken by the mouth or made into a pillow. It is largely owing to the hop contained in them that malt liquors possess their tonic properties. A bag filled with the dried strobiles, and dipped in very hot water, makes an agreeable fomentation in colic, internal pain, or local inflammation.

**Magnesia** and its carbonate act in the same way; entering the stomach they are partly dissolved by the gastric juice and absorbed; the residue passing down the bowel is converted probably into bicarbonate of magnesia, and, acting like the sulphate, though much more mildly, it purges or acts as a laxative. The antacid properties of magnesia are serviceable in acid dyspepsia and heartburn, whilst its tastelessness and freedom from acrid qualities and danger, in large doses, make it a favourite purgative for children. The carbonate solution is bitter, and is less liable to lead to the formation of concretions of magnesia in the colon, than the lighter powders. Gregory's powder is a valuable antacid laxative tonic. Magnesia can be given in 2 dram doses in milk or lemonade. This latter increases greatly its purgative qualities. The carbonate, by giving off carbonic acid in the stomach, has local sedative qualities not possessed by magnesia. The Liquor Mag. Cit. is an agreeable and mild purgative.

*(Dr. Gregory's Colic Mixture.)*

℞.

*Magnesiæ Carb.* ℈j.
*Tr. Card. Co.* ʒij.
*Aquæ Anethi* ℥ss.
*Syrupi* ʒij. *misce.*

*Fiat mistura sumat cochleare* i. *minim. frequenter in dies.*

**Magnesiæ Sulphas** is the most certain and safest of the saline purgatives. It is absorbed by the blood vessels of the stomach, and enters the blood, from which it is eliminated by the intestinal glands lower down, bringing with it in its passage outwards, much water and some serum of the blood, by acting as a powerful stimulant to the intestinal glandular apparatus.

From its low diffusive power, the greater part of it is supposed to pass down the canal without being absorbed, and may also probably irritate the glands by its presence. Many experimentalists believe that the salt acts by staying in the bowel and as it passes down, attracting to itself the fluid already there thus purging solely by virtue of its power of preventing the re-absorption of the intestinal fluid. Though this is held by many excellent authorities, it is very improbable, as it is known that an isolated loop of intestine into which the salt is introduced soon has its fluids increased. Buchheim found that the motions contained no albuminous substance after purgation with this salt; and many infer from this that it acts solely by retaining the fluid originally in the bowel; but the absence of albumen should be regarded as a proof of the eliminatory theory mentioned above.

The purgative effects of sulphate of magnesia are greatly increased by dilution with water, or the addition of a dose of dilute sulphuric acid, and the salt acts rapidly if the upper part of the canal is empty. It forms an agreeable combination with the acid infusion of roses, or in the following:—

℞.

*Magnes. Sulphat.* ℥ij.
*Magnes. Carb.* ʒij.
*Aquæ M. Pip. ad* ℥xij. *misce.*

*Sumat* ℥ii. *tertiis horis ad effectum, p. p. a.*

**Manganese Salts** act somewhat after the manner of iron, but possess no advantage over it. The black oxide is merely introduced into the Pharmacopœia for making chlorine.

**Manna** acts as a mild purgative or laxative, and was formerly much used for children. It causes flatulent distention and griping from its irritation of the bowel. It may be given with great advantage in infusion of senna.

**Marmor Album** is never used except for making carbonic acid gas.

**Mastiche** possesses in a feeble degree the stimulating properties of the turpentines. It is eliminated by the kidneys, and acts upon the genito-urinary tract, and it is occasionally prescribed with the intention of operating as a mild astringent to this region of the body, checking profuse discharges.

Since it seems also to pass out in the exhalations from the bronchial mucous membrane, it may be used to lessen the profuse discharge in chronic suppurative inflammation of this surface. It has been long used in the East as a masticatory to perfume the breath, and it retains a place in the composition of various modern dental preparations, and is used by the pharmacist as an ingredient in some pill masses, to which it gives firmness and body.

**Maticæ Folia** possess aromatic and tonic properties of a low order. Matico is seldom prescribed internally, except with the idea of its acting like cubebs upon the inflamed urethral surface. It is used as a local application to bleeding points, and the leaf was supposed to act in this way on account of its reticulated structure; but the impalpable powder acts as a local astringent, and is valuable in treating leech bites and small bleeding wounds. Its astringency, however, is not owing to the traces of tannin, which it contains, but probably to its volatile oil.

**Mel Depuratum** is seldom used in medicine, except as a hicle for more active remedies. In large doses it acts as a xative. It has been praised for its expectorant qualities, which, if they exist, are probably owing to its local effect upon the throat and fauces, acting as a ciliary excitant by impressing the terminal filaments of the nerves, and by reflex action affecting slightly the secretion in the cells of the bronchial mucous membrane. Externally, honey has been used as a protective application to boils and excoriations. Its efficacy in aphthous states of the mouth entirely depends upon the borax with which it is usually associated, pure honey aggravating the condition of matters when applied alone. It has antiseptic properties like sugar. Oxymel is used as a cough syrup, and probably its action is purely local.

**Menthæ Piperitæ Oleum and Menthæ Viridis Oleum**—Identical in action, these grateful aromatics are rapidly absorbed into the system, and behave as mild diffusible stimulants. Coming in contact with the gastric mucous membrane, they exercise at first a stimulating and afterwards a local sedative effect, dispelling nausea and correcting uneasiness. By their local stimulating action on the bowel they correct the irregular painful sensations caused by accumulations of flatus, giving speedy relief, probably through a reflex act by driving on the imprisoned gas. Often after a large dose, pain instantly disappears and flatus is expelled, and this may be frequently observed in infants and feeble females. In a somewhat similar way the griping of cathartics is obviated without diminishing their purgative effects. Half a teaspoonful of the essence or 5 minims of the oil may be given in a little hot water and sugar, and repeated every hour if necessary.

**Mezerei Cortex**—Used now only as an irritant; when applied externally it causes inflammation of the skin and raises the cuticle like cantharides, though uncertain and slow in its action. It has diuretic properties, and was at one time supposed to act as an antidote to the poisons of syphilis and rheumatism, and to be useful in inveterate skin diseases—properties which experience has failed to substantiate.

**Mica Panis**—Bread-crumb is not introduced into the Pharmacopœia on account of its nutritious properties, but rather for the sake of its physical qualities. It is employed as a soothing application in the form of poultice to local inflammations, as it absorbs and retains a considerable quantity of hot water. Bread-crumb is also a very good excipient for pill masses, giving both firmness and toughness to brittle pills.

**Mori Succus**—Mulberry juice is a mild laxative when taken in quantity. It contains tartaric acid, and, like it, acts as a refrigerant in febrile conditions, probably allaying thirst by its local action upon the parched throat and fauces. The syrup is the form in which it is usually administered, but it is seldom used except to impart its beautiful lake colour to mixtures, gargles, &c.

**Morphia.** (See Opium.)

**Morrhuæ Oleum** is an easily-digested fat, possessing very high nutritive qualities. Its great efficacy as a restorative agent in wasting diseases, depends to some extent upon its power of aiding the assimilation of other foods, which would not be absorbed except in its presence. It is more easily absorbed than any other oil or fat. After meeting with the pancreatic juice and bile, it readily emulsifies and enters the lacteal vessels more easily than other oleaginous substances, and it appears to have the power of bringing along with it the oily and nitrogenous elements of the food. Digestion is thus considerably facilitated, the blood corpuscles are augmented, the weight of the body is increased, and a stimulus is given to healthy cell formation which, to some extent, depends upon fat supply.

The utility of cod-liver oil in most wasting diseases is beyond dispute, and often its effects are decidedly curative in some forms of chronic phthisis, and in conditions like scrofula, syphilis, and rickets, depending upon defective nutrition or errors in assimilation.

By directly supplying fat, which is an important element in the composition of the nervous system, cod-liver oil is beneficial in nervous exhaustion and neuralgia, and hastens repair in various structural and functional affections of the nerve centres. In a similar way, by supplying fat where there is much muscular wear and tear, the body-weight is kept up; and recent physiological research shows that fats are directly and easily converted into muscular force, and that prolonged exertion can be maintained on oils alone.

The chemical constituents found in cod-liver oil have been constantly regarded as affording a satisfactory explanation of its effects in directly increasing the weight of the body and combating disease; but the small amounts of iodine and biliary matter are too insignificant to account for its action, and, moreover, these remedies do not produce the beneficial results of the oil when they are given alone.

The writer found, as a result of carefully weighing the subjects of disease under a course of cod-liver oil, that they nearly always increased considerably more than the weight of the oil taken by them. This holds good also in health, and does not appear to be explained by the increase of appetite which it often produces. It is probable that the oil, by causing the absorption and assimilation of food elements not usually finding their way into the lacteals, nourishes the body independent of its own highly nutritious qualities. This power of aiding the absorption of other substances may probably be explained by the biliary compounds contained in cod-liver oil, though they have no action in the blood after digestion is completed. The many diseases for which this remedy appears to act as a specific depend upon some deep-seated error in assimilation, which is removed by the continued use of this valuable food and medicine. Hence the slowness of its action in cases of chronic rheumatic arthritis, lupus, psoriasis, &c., as it must first remove the condition upon which these ailments depend before any improvement is noticed in the symptoms.

Cod-liver oil should not be given in febrile conditions of the system, nor in irritable or catarrhal affections of the stomach and intestines—its administration in such cases being often productive of mischief. Phthisis, accompanied by high temperature, is not benefited by it, but a slight degree of fever should not prevent its administration if the digestive organs are healthy; and if in such cases an effervescing mixture of bicarbonate of potash with lemon juice be given with a minute quantity of morphia for three or four days *the oil will be often relished afterwards*, and the febrile symptoms and discomfort frequently disappear.

No advantages follow the mode of giving cod-liver oil in large doses except that the surplus quantity generally acts as a mild purgative, but it often upsets the stomach and causes slight congestion of the liver. Teaspoonful doses will be found enough to begin with in all cases, and it is a good rule to confine its administration to bed-hour for the first few days. It should be always given *soon after a meal*. Various plans are suggested to cover its taste, and many forms are vaunted for this purpose, but it is probable that the efficacy of the oil is diminished by the saponification and chemical changes which it undergoes in producing many of the so-called emulsions. It can be emulsified by gum acacia or tragacanth, and flavoured with cinnamon, lemon, or bitter almond. This latter is the best, but, as a rule, it is advisable to begin with the oil in small doses, and leave the vehicle to the taste or caprice of the patient, who may try water, milk, coffee, wine, orange juice, beer, punch, &c. Some patients can swallow the oil without any trouble, but the unpleasant eructations afterwards cause intense discomfort. In these cases the addition of any flavouring ingredient is a mistake, and the only preventive (if the patient can tolerate it) is to hold the oil in the mouth for a time, and cause it to be thoroughly mixed with saliva by moving the tongue round the inside of the cheeks

Where this can be tried the oil will be found to rapidly digest and give no subsequent trouble.

Where no method can be found by which the oil is retained in the stomach, then recourse must be had to inunction; two to four drams should be rubbed into the skin after a hot bath, and there can be no doubt that good often follows this practice. It is of the greatest use in the wasting diseases of children. After about one tablespoonful is well rubbed into the skin of the abdomen a deep flannel binder should be put on. This in a few days becomes saturated with the oil, and should be covered with as much thin mackintosh as will surround the body. The inunction should be repeated twice a day, and the flannel should be changed not oftener than once a fortnight.

**Moschus** is a diffusable stimulant, acting directly upon the nervous system and dispelling spasm. It has enjoyed some reputation in low febrile and typhoid states with great nervous excitement followed by prostration. It has also been used in various disorders supposed to be of spasmodic origin. The dose (10 to 20 grs.) costs so much that the use of the drug is now practically confined to cases of such gravity that there is little opportunity given to test its very questionable properties, and, moreover, it is difficult to get the genuine article free from adulteration.

**Myristica**—Nutmeg is a well-known aromatic stomachic remedy, often used for its agreeable flavour. In small doses (10 grs.) it acts as a stimulant to the stomach by increasing the flow of the gastric juice, aiding digestion and promoting the desire for food. In the same way it acts further down the canal by dispelling accumulations of gas and relieving colic and spasm. In large doses it is a *powerful and even dangerous narcotic*, acting upon the cerebrum and producing symptoms like those following poisonous doses of camphor, viz., vertigo giddiness, and coma.

**Myrrha** possesses the power, in common with other gum resins, of stimulating mucous surfaces, and so influencing their relaxed conditions in disease that the abundant secretion is checked; thus bronchial catarrh and chronic cystitis are improved; and it appears likewise to relieve leucorrhœa and diminish excessive secretion from the cervical mucous surface. Its reputed emmenagogue properties, which have given it a prominent position in the Pharmacopœial preparations intended to act upon the uterus, appear to rest upon very questionable foundation.

Locally, myrrh has a very beneficial tonic action upon diseased mucous surfaces, and may be applied to spongy gums and aphthous conditions of the tongue. Foul ulcers are likewise benefited by it.

*(For Amenorrhœa.)*

℞.

*Pulv. Myrrhæ gr.*ii*ss.*

*Ferri Sulph. Exsic. gr.iss.*

*Ext. Aloes Socot. gr.*½.

*Glycrin. Tragacanthæ* q.s.

*Ut fiat pil. mitte tales* xxxvj. *sumat. i. bis in die.*

**Nectandræ Cortex**—An astringent tonic. (See Beberiæ Sulp.)

**Nux Vomica** and its active principle, strychnia, were found by Magendie to act directly upon the spinal cord, and so thorough were his experiments that recent investigators have added little to his valuable conclusions. When given in moderate doses, strychnia is found to act as a mild stimulant or exciter of the centres of those nerves going to supply the striped muscular tissue of the body. Experiment proves that it neither acts upon the brain nor upon the muscles themselves, nor upon the nerve-trunks or endings, but only upon that part of the cord where the motor *centres* are situated. A large dose acts as a violent irritant to this part of the nervous system, causing tetanic convulsions of all the voluntary muscles, soon followed by spasm of the respiratory apparatus, and causing death by rigidity of the diaphragm and thoracic muscles.

The vaso-motor centre is stimulated, and the arterial pressure rises. The symptoms closely resemble those of tetanus, but rigidity does not begin in the muscles of the jaw, and when present does not last between the paroxysms; and when the convulsions pass off, generally there is complete relaxation of all the affected muscles. The symptoms come on rapidly, and soon pass off, or are fatal; and there is no history of a wound or operation.

The sympathetic system also appears to be stimulated by strychnia, and the pupil dilates under its use.

Owing to its stimulating action upon the reflex function of the cord, strychnia is useful in the treatment of many neurotic affections. In paralysis it is invaluable when given in suitable cases. Thus, in hemiplegia, paraplegia of reflex origin, and in various forms of local paralysis, strychnia is the most serviceable remedy we possess; but it should not be given—(1) in recent cases, (2) whilst *rigidity* exists, or (3) in cerebral paralysis with continuance of head symptoms; (4) nor is strychnia of much use where great wasting or fatty degeneration of the affected muscles is present, nor (5) where the muscles do not respond to the electric current.

Various spasmodic diseases are benefited or cured by strychnia; thus, chorea, asthma, and epilepsy have their advocates for this treatment, and, as a rule, in such cases full doses must be given till the physiological effects of the drug are observed.

Strychnia acts most beneficially upon the alimentary canal; being a pure bitter, it increases the tone and vascularity of the stomach, improves appetite, and promotes digestion; and in atonic dyspepsia and various chronic catarrhal affections of the gastric mucous membrane it acts as an excellent tonic. Further down the canal its effects are even more marked; by its stimulating power over the reflex action of the cord it greatly increases the muscular contractions of the intestinal tube, counteracting constipation and fæcal accumulations, and affording a valuable addition to purgatives. These effects are so marked that occasionally the stools are much altered in size, *and may be seen to present the attenuated appearance observed in stricture of the rectum.*

In the same way, nux vomica or strychnia proves useful in prolapsus of the anus and atony of the bladder, and has a direct tonic effect upon the genital organs, causing erections and emissions. Functional amaurosis often very rapidly yields to strychnia in $\frac{1}{30}$ gr. doses.

In local paralysis, the hypodermic injection of strychnia will be generally found to give splendid results. From $\frac{1}{80}$ to $\frac{1}{30}$ of a grain injected into the muscular substance is soon followed by increased growth and power. As a rule, it is said to be useless in cases where the muscles will not respond to the slowly interrupted current, but beneficial results will, undoubtedly follow its use in many cases where electrical stimulation cannot be detected. Barwell injects $\frac{1}{30}$ to $\frac{1}{12}$ of a grain in infantile paralysis, but it is not advisable to begin with more than 2 or 3 minims of the official liquor.

There is some evidence that strychnia accumulates in the system, and its administration should be carefully watched. It is advisable not to begin with a larger dose than $\frac{1}{30}$ gr., which may be gradually increased to the $\frac{1}{12}$ or $\frac{1}{10}$ gr. The liquor contains 1 grain in 120 minims, so that 4 minims, ntiously increased to 10 or 12, will be a proper dose for an t; 10 to 20 minims of the tincture of Nux Vomica, and

½ gr. of the extract will be enough for a fair dose. Though the Pharmacopœia directs ½ to 2 grs. of the extract, this must be considered a very full dose.

☞ *Antidote*—After the free use of the stomach-pump many remedies have been proposed, and opinion is much divided between chloral, chloroform, Calabar bean, conium, morphia, ether, &c., but the best staff to lean upon in such an extremity is one which will generally be found within reach—tobacco; it is, however, a very dangerous and powerful remedy.

After the above was written, and while these pages were passing through the press, the writer had a case where nearly 6 grains of strychnia were taken with suicidal intent by a strong, healthy man, about 35 years of age. Dreadful convulsions came on in about eighteen minutes, and five minutes afterwards he saw the patient and used the stomach-pump. During the operation of removing the contents of the stomach, which was done rapidly, the patient was completely asphyxiated. Death appearing inevitable, he injected 1 oz. ether, with 10 ozs. of whiskey into the stomach, and 5 oz. whiskey into the rectum, and kept up artificial respiration for about 2 minutes. Marked improvement apparently set in, though the spasms occurring every two or three minutes, still continued. The patient was then put under the influence of ether and afterwards of chloroform, which was administered for five hours with short intermissions, 1 oz. of bromide of potassium being given in the intervals, with 10 oz. more whiskey. As late as six hours after the dose was taken the spasms were so violent as to threaten life, but they soon subsided under the influence of more alcohol, and the patient made an uninterrupted recovery.

The catheter was passed about seven hours after the convulsions commenced, and 8 oz. urine was drawn off. The most careful examination failed to find the faintest evidence of the presence of strychnia, and three frogs were unaffected by the injection of half a dram of the urine, while one of them afterwards succumbed to the injection of one drop of a weak solution of strychnia. The urine was loaded with motionless spermatozoa; there were emissions during the spasms.

It was found nearly impossible to get the patient completely under the influence of the chloroform, though he was several times unconscious from the asphyxia caused by the impeded breathing. The writer has no doubt of the part played by the alcohol in saving the patient's life.

The following forms will be found convenient for the administration of Nux Vomica and its alkaloid:—

*(A good Tonic in Dyspepsia and Paralysis.)*

℞.

*Tinct. Nucis Vomicæ* ʒivss.

*Acid. Nit.-Mur. Dil.* ʒvj.

*Tinct. Aurantii* ℥j.

*Inf. Gentianæ Co. ad* ℥x. *misce.*

*Fiat mist. cujus cpt.* ℥*ss. mensurâ ex* ℥i. *aquæ ter in die ante cibos.*

*(Pills for Constipation.)*

℞.

*Ext. Nucis Vomicæ gr.ss.*

*Ferri Sulph. Exsic. gr.ss.*

*Ext. Aloes Socotrinæ gr.*¼.

*Pulv. Glycyrrhizæ gr.*iss. *misce.*

*Fiat pil. mitte tales* xxiv. *i. mane nocteque sumend.*

℞.

*Liquor. Strychniæ* ʒij.

*Tinct. Calumbæ* ℥ij.

*Infus. Caryophylli* ℥x. *misce.*

*Fiat mist. cujus capt.* ℥*ss. ter in die.*

**Olivæ Oleum** is one of the best official laxatives; given in ounce doses it produces soft, painless motions, and, by its soothing qualities, it protects the bowel from contact with irritating secretions, foreign matter, or partially digested food. Thus it is highly beneficial in constipation, inflamed or ulcerated hæmorrhoids, and fissure of the rectum or anus; it is especially useful as a laxative, in ½ to 1 oz. doses, in cases where the bowels have been locked up by opium. In small quantities it is a nutritious food.

Externally, its bland unirritating qualities have obtained a place for it in various liniments, poultices, plasters and ointments.

℞.

*Olei Olivæ (Recentis)* ℥vj.

*Cpt. cochleare unum magnum ex paululo lactis omni mane.*

**Opium and Morphia** resemble each other so closely in their action that the brief description here given will apply to both.

A moderate dose of opium will act upon the alimentary tract from the mouth to the anus; dryness of the lips, tongue, throat, and gullet will be evident in a very short time, secretion being stopped or diminished; gastric juice ceases to flow, digestion is retarded, and the appetite fails. The intestinal fluids are not secreted as before, and constipation ensues after a time. Arterial tension rises, the pupils contract, and the nervous system is influenced; first—there is a sense of pleasant activity of the cerebral faculties, ideas flow with speed through the mind, and exhilaration bordering upon mild intoxication may be noticed, soon followed by a calm of variable duration, which passes into drowsiness and sleep.

Headache, mental confusion, and malaise, with digestive disturbance, often remain after waking.

In fuller doses the above symptoms are present, only in greater intensity; the stage of stimulation is *shorter*, the somnolency comes on swiftly, and soon passes into sleep, with irregular, slow breathing; and if the dose be large enough, coma supervenes. In poisonous doses sleep comes on so rapidly that the excitement stage is not apparent.

Opium checks every secretion in the body except that of the skin and mammary glands.

Only the higher cerebral centres are affected by full doses, but if repeated, gradually the basilar ganglia are influenced, and death occurs from asphyxia through paralysis of the respiration or circulation. The spinal cord does not escape, as may be often noticed by the retention of urine following large doses, and the sensory nerve fibres throughout the body are more or less under the spell of opium, for sensibility becomes markedly diminished, apparently by the conductivity of the impressions being less perfect.

These two distinct effects produced by opium—cerebral *excitement* in the first instance, and *sleep* afterwards—vary very much in different individuals, and also to some extent depend upon the way in which the drug is administered. Thus, in nervous excitable women, the first effect may be the only one noticeable, sleep not following; while, again, a very large dose will likely produce only the second effect, no excitement, or only a momentary flash being observed, sleep swiftly supervening. By graduating the dose, the opium eater can avoid the second stage, and prolong the excitement indefinitely.

The way in which opium produces sleep cannot be demonstrated, but it is probable that it acts in two ways, as Fothergill points out—(1) by an action upon the vascular system, which causes anæmia of the brain; and (2) by an action upon the cerebral cells, which results in their diminished activity, whereby they attract or demand less blood; and by this combined condition of arterial anæmia and cellular lethargy sleep is brought about. The extreme contraction of the pupil, characteristic of opium poisoning, is caused by the action of the drug upon the cerebral cells.

These hypnotic and anodyne qualities of opium render it the most important drug in the Pharmacopœia, and its application in disease is so extensive that only a brief reference to its therapeutic uses can be made.

To produce sleep in all conditions requiring it, in the restless delirium of fevers, and in nervous prostration from whatever cause, opium is the best known hypnotic; its good effects are seen in delirium tremens and in acute and chronic mania and melancholia.

As an analgesic or pain reliever opium or morphia surpasses all others in certainty of action and safety. It relieves the pain of sciatica, neuralgia, lumbago, gastralgia, and cancer, and soon removes the agony caused by the passage of renal or hepatic calculi. In these cases the hypodermic injection of morphia is by far the best form in which to administer the drug, and it is a mistake to regard its effects as merely palliative, for sciatica is often cured by a single insertion of the needle, a result which is not met with when morphia is given by the mouth. The physician must guard against the patient getting into the habit of using the syringe too often, as there is great danger of the opium habit becoming established; and though space prevents the description of the evil arising from opium eating, a word may be said about its treatment. The writer has found success follow the plan of *free alcoholism.* In one case of ten years standing, after the patient voluntarily gave up his indulgence, he had whiskey administered in such doses as to keep him under its influence several days, at the end of which the case was treated as one of ordinary alcoholic excess, except that the stimulant was gradually withdrawn; complete success followed, and the effects were permanent.

Though this plan is open to the risk of establishing a more terrible disease than that which it is intended to cure, still it appears worth trying, but should only be used in cases where a considerable remnant of will remains.

Cough is relieved by opium, but some discrimination should be exercised in the exhibition of the drug for this purpose. In cases of exhausting bronchitis, with profuse expectoration, where there is only enough cough to empty the tubes, this remedy is a dangerous one; but where a harassing, frequent cough wears down the patient's strength, without much secretion, then opium is a blessing. It acts in these cases by diminishing the excitability of the respiratory centre.

In acute inflammations, opium gives the best chance of cutting short the disease and guiding it to a safe termination. If given at the very onset of formidable affections, like acute peritonitis, opium may be safely taken to a surprising extent; and the amount of pain present affords the safest measure for the dose. Dram doses of the tincture may be in such cases administered, and to guard against the risk of its lying in the stomach and being suddenly absorbed after an interval, it is wise to give it in several ways alternately—endermically; by the mouth or rectum; or hypodermically. It has long been a recognised fact that opium given with no sparing hand will often save life in severe inflammations, especially of serous membranes.

The researches of Brunton lead him to believe that opium, by destroying the effects of a stimulus to sensory nerves, diminishes the supply of blood to the affected part; and thus the explanation of what may be noticed in such cases—that opium sometimes acts like blood-letting. The peristaltic action of the bowel is diminished, and thus it is doubly useful in inflammation of the peritoneum; and from its tranquilising effect upon the circulation it is invaluable in hæmoptysis and other hæmorrhages.

Small doses ($\frac{1}{10}$ gr. solid opium) have been found successful in the treatment of irritative dyspepsia; and all enteric affections with excessive secretion, after the irritating cause has been removed by purgatives, are benefited by opium;—thus, dysentery, enteritis, cholera, &c., are so relieved.

After abdominal surgical operations, a morphia suppository is followed by great benefit, and opium has been found useful in averting the rigor liable to follow urethral injuries from whatever cause. The presence of severe pain is always an indication for a large dose of this drug; women are more susceptible to morphia or opium than men; children bear both very badly, and the physician will be wise who makes the rule never to give opium in any form to a child under a year old, in the first few years of his practice. Disease of the kidney has been said to be a barrier to the use of opium; but recent experience shows that the hypodermic injection of morphia is often beneficial in uræmic convulsions.

There is, however, nothing which seems to influence the dose of the drug like idiosyncrasy, some bearing very small doses badly; and the after evil consequences—headache, nausea, intolerable itching, &c.—vary much in different subjects.

The various alkaloids found in opium produce different effects when administered separately—thus,

Morphia, Narceine, and Papaverine are highly hypnotic; while Thebaia and Codeia are very exciting, and Apomorphia is a violent emetic; but it is only with morphia that the physician has to deal. It differs from opium in being (1) less astringent and constipating; (2) less powerful as a diaphoretic; (3) it possesses less power over acute inflammations, especially in the abdomen; (4) it is less likely to cause excitement, headache, and nausea; (5) it is more decidedly hypnotic and anodyne, and more liable to cause itching and retention of urine.

The dangerous symptoms often following the hypodermic injection of morphia are certainly less likely to occur if $\frac{1}{100}$ gr. of atropia be added to each dose, and the combination is more effective. Not more than ⅛ to ¼ gr. of morphia should be given for the first time by the hypodermic method. Externally, opium has little, if any, activity when applied to the unbroken skin.

Of the various official preparations, none equal in certainty and uniformity a pill made out of the crude opium; powdered opium is about ⅛ stronger. Both these preparations may be given in 1 to 2 gr. doses; and next to them in constancy comes the tincture, which will, in ordinary cases, produce sleep in ½ dram doses. The favourite Dover's powder expends itself chiefly upon the skin, which it stimulates more than a much larger dose of either of its constituents would do if given singly. One grain of morphia is equal in power to about 6 grs. of opium.

☞ *Antidote.*—Emetics, the stomach-pump, hot coffee, cold affusion, and the hypodermic injection of atropia. The persistence of stimulation, and even artificial respiration, never permitting the patient to sleep or rest till the drowsiness and irregularity of the breathing pass off, may often save an apparently hopeless case; electricity may be employed.

R.

*Pulv. Opii gr.*v.

*Pulv. Glycyrrhizæ gr.*xx.

*Ext. Opii Aquosi gr.*v. *misce.*

*Fiat pil.*x. *st.* i. *quartis horis.*

℞.

*Liq. Morph. Mur. m.* xxx.
*Aq. Laurocerasi m.* xv.
*Pot. Bromidi gr.*xxx.
*Syrupi Simplicis* ʒiv.
*Aq. Destillatæ ad* ℥ij. *misce.*

*Fiat haustus hora somni sumendus.*

**Os Ustum**—Bone Ash is only employed in the making of phosphates of lime and soda.

**Ovi Vitellus**—Egg-Yolk is highly nutritious, consisting of nearly 30 per cent. of oil and crystallisable fat, and 18 per cent. of albumen and some phosphorus. It is largely used in making emulsions, and enters into Mist. Spt. Vini Gallici.

**Oxymel and Oxymel Scillæ.** (See under Mel and Scilla.)

**Papaveris Capsulæ** resemble opium in their action, which is feeble and uncertain; the extract, when carefully prepared, is a good hypnotic, not so liable to cause headache and nausea as opium. The decoction of poppies has long enjoyed a reputation as an anodyne when applied to various local inflammations; its good effects are partly owing to the moist heat of the application.

**Pareiræ Radix**—After being swallowed, a large dose acts as a mild laxative, probably either by being eliminated by the intestinal glands, or by stimulating the peristaltic movements of the gut. After its absorption, it is eliminated by the kidneys which it stimulates, thus acting as an efficient diuretic; and, as the active principle passes over the mucous membrane of the genito-urinary tract, it exercises a soothing and tonic influence. This is most marked on the bladder, and in cases of chronic cystitis the excessive secretion is diminished and replaced by a healthy discharge of pus. In the same way suppurative kidney affections are relieved, and sometimes unhealthy conditions of the urethra, causing gleet and smarting pain after micturition, are entirely removed by pareira. Its effects seem intensified by combining it with alkalies, and the liquid extract is the most certain and elegant form in which to administer the drug. Its active principle undergoes change in the blood, for when injected for gonorrhœa and cystitis it does not appear to have any local beneficial action upon the diseased membrane, though occasionally it appears to act like an ordinary tonic when admitted to the stomach.

℞.
*Ext. Pareiræ Liq.* ℥ij.
*Liquor. Potassæ* ʒiv.
*Decoct. Pareiræ ad* ℥x. *misce.*

***Fiat mist. cpt. cochleare amplum tertiis horis e cyatho vinosa aquæ.***

**Pepsin** (the principle found in the gastric juice) is a ferment possessing the power in presence of warmth, acidity, and moisture of converting albuminoid and proteinaceous foods into syntonin and peptones. Pepsin will work this change outside the body, and there can be no doubt that a similar alteration takes place when pepsin is administered with food to a stomach incapable of secreting enough juice for its own wants. This deficiency of gastric juice, moreover, is known in many cases of atonic dyspepsia to be the direct cause of the indigestion, and hence it is that pepsin in such cases becomes so valuable. In irritative dyspepsia, with excessive secretion of acrid gastric fluid, pepsin often does harm unless given in one very large dose (30 grs). In these cases it is a doubtful remedy at the best. Lactopeptine will be found the most satisfactory and certain form in which to administer this drug.

Two facts should be remembered in prescribing pepsin—(1) that it is a *ferment*, and large doses are not generally necessary, since its activity depends more upon the *state* of the stomach's contents than upon the *amount* of the ferment administered; and (2) that it acts as a direct stimulant to the gastric mucous membrane, which it causes more copiously to pour out its own secretion. It is recommended in the diarrhœa of children depending upon the presence of quantities of partially digested food passing along the intestines, and in these cases there can be little doubt of its efficacy. It is useful in some forms of vomiting and nausea, probably caused by imperfect digestion. Large doses of pepsin will be found to act as a mild purgative, possibly by causing the absorption of bodies which are afterwards eliminated. Often in distressing dyspepsia, accompanied with large quantities of gas being rapidly emitted from the stomach, lactopeptine speedily gives relief.

Rennet, or milk to which more pepsin is added than is necessary to cause coagulation, is a tempting form in which to administer this remedy in atonic dyspepsia. Pepsin added to nutrient enemata greatly increases their chances of being absorbed.

**Phosphorus**—In small doses this substance is a tonic and stimulant to the nervous system, probably by acting as a restorative and supplying food to nerve tissue. The mental faculties seem more active, the circulation is quickened, and the pulse rises; the temperature is said to rise also, and the capillaries of the skin dilate, causing perspiration; the products of waste are increased in the urine, and the appetite increases, whilst the weight of the body also is augmented. After a considerable time the bones are affected, osseous deposit filling up the medullary canal; and it has been proved, as the result of experiments upon animals, that the cancellated tissue becomes compact bone.

In larger doses vomiting, purging, and the ordinary signs of irritant poisoning supervene, only they may first show themselves *several days after the last dose has been taken*—with cardiac weakness, reduction of temperature, jaundice, and fatty degeneration of the liver and muscular tissue generally.

From its restorative effect upon the nervous system, phosphorus has been extensively tried in neuralgia, on the ground of this affection being always associated with a more or less impoverished condition of the diseased nerve. Often very decided benefit and cures follow its administration, but it can hardly be said to afford as good results as the longer tried and better known plans of treatment. It is valuable in cases of simple brain exhaustion from prolonged mental strain; and in many diseases characterised by wasting or atrophy of the nerve centres its good effects have been occasionally observed. It has marked influence on the centres which preside over the reproductive act, and is a reliable aphrodisiac in cases of functional loss of power.

In affections depending upon mal-nutrition, as rickets, pernicious anæmia, or leucocythæmia, phosphorus will generally be found a valuable remedy. Its stimulating action upon the skin has led to its successful employment in developing the suppressed rashes of the eruptive fevers, and as a substitute for arsenic in chronic scaly skin diseases. From its marked influence over the growth of bone it will be of great service as a constitutional treatment for ununited fractures, especially during pregnancy.

It has long been a recognised fact that the fumes of phosphorus will cause disease of the jaws, leading to exfoliation of the bone ; and it is nearly certain that this action is a local one, caused by the vapour reaching the alveolus through a decayed tooth. It does not follow the internal administration of the drug, even in poisonous doses, and only affects those exposed who have caries of the teeth.

Not more than $\frac{1}{30}$ grain should be given at first, and its effects should be carefully watched. The phosphorated oil may be conveniently given in gelatine capsules, each containing 5 minims. The official pill is apt to pass undigested through the alimentary canal. Suet has been the favourite substance used by pharmacists to make phosphorus into a pill mass, but the student will find some hints on this subject in chapter viii. of the Section Pharmacy at the beginning of this book ; or when prescribing, he may order any of the excellent formulæ of Mr. Kirby.

☞ *Antidote*—After emetics, of which sulphate of copper is the best, as it enters into combination with phosphorus, oil of turpentine should be freely given. It has been clearly proved that this substance prevents the combustion of phosphorus in the blood, and hence prevents the consumption of oxygen. The common or commercial oil is the one to be used, and it must be *old*. This ensures its richness in ozone.

For *Phosphate of Lime* and *Phosphoric Acid*, see under Calcium and Acid. Phosphoricum. Neither of these substances possess the properties or therapeutical virtues of free phosphorus.

**Physostigmatis Faba**—Calabar bean is a deadly poison, long used by the Western Africans as a superstitious ordeal for determining the guilt or innocence of suspected witches.

In repeated doses of $\frac{1}{2}$ gr. of the spirituous extract the physiological effects of the drug soon become apparent. They may be briefly summarised:—The cerebrum remains unaffected, the poison producing its deadly influence mainly upon the spinal cord, which it soon renders incapable of conducting impressions, thus causing complete and general paralysis. Frazer's experiments prove that this paralysis does not depend in any way upon the effect of the bean on the muscles themselves, their contractility remaining after death. The reflex activity of the cord is totally destroyed. After a time, like conium, it weakens the peripheral terminations, and then the trunks of the motor nerves, leaving the afferent nerves unaffected ; but this latter result does not account for the general paralysis, which depends entirely upon the state of the spinal cord. Death results from its depressing influence on the respiratory centre causing suffocation, or from cardiac weakness, caused by paralysis of the cardiac sympathetic.

The pupil is markedly contracted, this result apparently being brought about by paralysis of the peripheral filaments of the sympathetic, and the pupil contracts freely under the local application of Calabar bean. This power of diminishing the size of the pupil by applying a harmless quantity of the drug directly to the conjunctiva is largely utilized by ophthalmic surgeons—(1) to counteract the effects of atropia; (2) to prevent prolapsus of the iris after wounds of the cornea ; (3) to diminish the amount of light falling upon the retina in inflammations or hyper sensitive conditions of the eye, as in strumous ophthalmia and conjunctivitis. Transient alterations in vision and in the power of accommodation always result from its application to the eye. From its influence upon the spinal cord Calabar has been used successfully in two affections—in tetanus and strychnia poisoning. To be of use in tetanus the drug must be given early, and the hypodermic method of administration appears to give better results than when absorption from the stomach is trusted to. A solution of the alcoholic extract, to which a little alkali is added, should be injected, each dose contaning about $\frac{1}{4}$ of a grain; and in tetanus it should be pushed boldly.

In the general paralysis of the insane Calabar bean has been found successful in a few cases, and promises well. For chorea it is not likely ever to be much used, as we have efficient and *safer* remedies. Its poisonous power prevents its use as an intestinal or hepatic stimulant, or as a diuretic—properties which it possesses in full doses.

☞ *Antidote.*—After emptying the stomach and washing out with very strong coffee, the *physiological* antidote—atropia—should be promptly given by the hypodermic syringe. Strychnia has also been recommended.

**Pimento**, like cloves, is a stomachic, and though in large doses it acts as a stimulant of some power, still it is seldom employed in medicine, except as a flavouring ingredient or adjuvant to purgatives. Like the following remedy, it improves digestion, and increases the vascularity of the mucous membrane when administered in small quanties mixed with the food. Hence it may be taken as the type of condiments ; when taken into the mouth, by its piquancy it increases the flow of saliva, through the stimulation of the peripheral filaments of the fifth nerve, the impression being conveyed to the brain, from which it is reflected along the facial, and through its branches the salivary glands are excited. Probably, also, the reflected stimulus travels along the pneumogastric, and increases the quantity of the gastric juice even before the spice reaches the stomach. The essential oil of allspice, in 3 to 5 minim doses, is an agreeable remedy for flatulency and accumulations of gas in the intestines.

**Piper Nigrum** resembles the previous carminative and stomachic; and what is said about allspice is applicable also to pepper. It has been supposed to possess febrifuge properties; but evidence is wanting of any reliable effect of the drug in this direction. It increases the frequency of the pulse slightly, and stimulates the heart. After circulation in the blood it is eliminated by the kidneys, which it stimulates, and certainly at times increases the amount of their secretion, but its diuretic action is uncertain; it imparts to the urine a characteristic odour. In passing over the genito-urinary tract it exercises a very beneficial influence upon the bladder and urethra, and has the power of bracing up the relaxed and chronically inflamed mucous membrane of these parts in gonorrhœa and gleet. In this respect its action resembles that of cubebs, and it may stimulate, by reflex action, the genital organs, and possibly aggravate matters in the acute early stages of the disease. There is no evidence that it is eliminated by the mucous membrane of the lower part of the alimentary canal, though patients often, when questioned, will report that a sensation of warmth and comfort is felt at the end of the gut after the free use of pepper. This may, however, be caused by the *excess* of the remedy which passes through unabsorbed; nevertheless, pepper is decidedly beneficial in inflamed and relaxed conditions of the mucous membrane in the neighbourhood of the anus. In hæmorrhoids its good effects will be found by giving the official confection in teaspoonful doses three times a day. If cubebs be added, and copaiba balsam substituted for the honey, an elegant preparation results, which will seldom fail to arouse a healthy action in relaxed and painful affections about the anus; or the following formula may be used with or without the cubebs, the glycerine being an active substitute for the inert honey:—

℞.

*Pulv. Pip. Nig.*
„ *Carui.*
„ *Cubebæ a* ℥*ss.*
*Glycerini q.s. misce.*

*Fiat electuarium cujus capiat cochleare parvulum ter in die.*

**Pix Burgundica** is a mild rubefacient, and its physical qualities render it suitable as a basis for plasters. It is in this form that the drug is generally employed, and the good effects which have followed its application in lumbago, rheumatism, various painful joint and nerve troubles, have been attributed to some special stimulant or anodyne action which it was supposed to possess. It is, however, more likely that any good effect following the use of pitch, soap, resin, and various other plasters may be explained upon the hypothesis that the part after the application of the plaster is protected by it from variations of temperature, whilst the lymphatics are stimulated. The gentle pressure is productive of good, and aids absorption.

Burgundy pitch has been supposed to exert some special action upon the rectum, and has been employed, made into pills with the following liquid, as a remedy for hæmorrhoids.

**Pix Liquida**—Wood tar contains amongst its numerous and complex constituents some creasote and turpentine, upon which many of its properties depend. It is thus antiseptic and stimulating, and possesses considerable power in checking profuse bronchial secretion; it is also diuretic. But, since the improved methods of preparing carbolic acid have been extensively employed, tar as a remedial agent has fallen into comparative disuse. There are, however, virtues possessed by tar which are not equally enjoyed by its more fashionable rivals: for example, as an expectorant tar is decidedly superior to any compound which can be distilled from it. It probably exerts its beneficial tonic effects upon the bronchial mucous membrane in the act of its elimination, and while stimulating the epithelial elements of this secreting surface it is *probable* that the cilia are also stimulated to sweep along irritating and adhesive secretions more rapidly.

The recent carefully conducted experiments of Ringer on the administration of tar to patients with winter-cough, prove that this remedy has the power of diminishing the danger of "catching cold."

Tar possesses very decided advantages over creasote and carbolic acid in the treatment of chronic scaly skin affections. It is a powerful stimulant when applied to a healthy sensitive skin, and often causes considerable inflammation and pain. In psoriasis the ointment of tar in the Pharmacopœia, often speedily effects a cure; and in chronic eczema, with painful itching, this preparation occasionally will be found to relieve the itching, and at the same time remove the disease which causes it.

The internal administration of tar in 5 or 8 minim doses, gradually increased to 15 minims, in pills or capsules, is employed by Anderson in chronic eczema.

Tar water is made by adding 1 part of tar to 10 of water, and, after agitation and subsequent rest, on being poured off it makes a good stimulating lotion for wounds and sluggish ulcers. As a means of administering the remedy, it may be taken in wine-glassful doses.

*(For Hæmorrhoids.)*

℞.

*Picis Liquidæ gr*.iiss.

*Pulv. Acaciæ gr*.iiss. *misce.*

*Fiat pil. mitte tales* xxxvi. *st.* iii. *ter in die.*

**Plumbum**—All the salts of lead are more or less poisonous, and when administered for a time give rise to definite and easily-recognised symptoms. There is loss of appetite, wasting, pallor, and constipation, followed by slowing of the pulse and heart's action, with violent colicky pains and evidence of muscular impairment, as seen in paralysis of the extensors of the forearm, causing drop-wrist.

Lead becomes fixed in the tissues, and is deposited in the affected muscles. These at first present no signs of change on the application of electricity; but as the paralysis lasts the current seems to have less and less effect, till finally it does not cause any contraction, and the muscular fibres become the seat of fatty degeneration.

In addition to these changes in the muscles they also become the seat of severe wearing pains. The joints get stiff and very painful, probably owing to a urate of soda deposit, similar to that seen in gout; for lead prevents the excretion of urates by hindering the decomposition of uric acid. The structure of the liver and kidneys becomes affected, causing faint jaundice and albuminuria. A blue line appears along the gums, near to the teeth, after lead in small quantities has found its way into the system for any considerable time. It is caused by the metal deposited in the tissue of the gums being converted into a sulphide by the action of sulphuretted hydrogen generated from decomposition of fragments of food remaining between the teeth. It is best marked over the region of the incisors, and is absent or indistinct where the teeth are away.

The nervous system is seriously affected by lead, the changes in the sensory nerves giving rise to various neuralgic symptoms throughout the body; thus, gastralgia and sciatica may give trouble, sensibility to touch becomes diminished, and especially about the upper part of the body may this be noticed. The optic nerve occasionally suffers, producing symptoms of amaurosis.

Various muscles may be the seat of paralysis besides those of the forearm and hand; the deltoid and the laryngeal muscles are occasionally affected, and paraplegic or even hemiplegic symptoms may show themselves, and finally the lead deposited in the brain may cause delirium, convulsions, and coma.

Harley considers that all the effects of lead upon the system may be traced to the enfeeblement of the nerve currents from impairment of the isolating power of the nerve fibres. The presence of lead in the tissues, by increasing their conducting power, tends to cause a lateral diversion of the nerve force, and thus exhausts the currents in their to-and-fro passage.

The cause of the muscular action of lead is difficult to explain. It produces contraction of all the smaller vessels, and some suppose that it is through its influence upon the spinal cord, and not by its direct action on the muscular fibre, that it affects the wrist; whilst others offer an explanation by supposing that it exerts a primary effect upon the sympathetic. Abortion often results from lead poisoning, either on account of the toxic power of the drug on the fœtus or from its influence over the muscular tissue of the uterus.

As the different salts of lead have slightly different actions upon disease, they may be referred to under their different names.

*Metallic Lead* is inert in the system till converted into a soluble salt by acids, as those of the stomach.

*Acetate of Lead* is a valuable astringent. It combines directly with albumen, forming albuminate of lead, and when a strong solution is applied to a fresh wound or sore a film of this substance imperfectly glazes it over. It causes contraction of the vessels, when applied in weaker solution; thus it directly diminishes the blood supply, and checks excessive secretion in ulcers. wounds, eczema, and most local cutaneous inflammations. Itching is often relieved in this way, and a weak solution (5 grs. to 1 oz.) makes a good injection in gonorrhœa and gleet.

*Lead Collyria* should not be used in ulceration of the cornea on account of the danger of their forming opaque deposits in the tissue, interfering with sight.

Internally, the acetate finds its way into the blood, probably as an albuminate, and by its astringent effect upon the smaller vessels it diminishes the secretion of the bronchial tube, stops hæmorrhages, like hæmoptysis, and controls diarrhœas. 2 to

5 grs. may be given every two or three hours in these affections, and there is almost no danger of lead-poisoning ensuing, even though its use may be protracted.

*(For Active Hæmorrhage.)*

℞.

*Plumbi Acetatis gr.*xxxij.

*Liq. Morphiæ Acet.* ʒ*iss.*

*Acid. Acetic Dil.* ʒij.

*Aquæ Destillatæ ad* ℥viij. *misce.*

*Fiat mist. sumat cochlearia* ii. *ampl. secundis horis.*

*(For the Diarrhœa and Sweating of Phthisis.)*

℞.

*Plumbi Acetatis gr.*xxxvj.

*Ext. Opii. gr.*iv.

*Pulv. Opii gr.*iv. *misce.*

*Fiat massula, et divide in pilulas* xii., *e quibus una tertiis horis sumatur.*

The *Sub-Acetate Solutions of Lead* act like the acetate, and are generally confined to external application, where their unirritating astringent action render them invaluable in local cutaneous or superficial inflammations.

℞.

*Liq. Plumbi Subacet* ℥*ss.*

*Acid. Acetic. Dil.* ʒj.

*Spirit. Vini Rectif.* ℥*iss.*

*Aquæ Rosæ ad* ℥xij. *misce.*

*Fiat Lotio.*

A valuable astringent application to sprains, &c.

Or,

℞.

*Plumbi Acetatis* ʒiij.

*Acid. Acetic. Dil.* ʒiv.

*Aquæ Destillatæ ad* ℥x. *misce.*

*Fiat Lotio.*

*Carbonate of Lead* is only used externally as a sedative and astringent application to excoriated or inflamed surfaces, either in the form of ointment or in fine powder dusted over the affected spot.

The *Oxide* possesses similar desiccant properties, but is seldom used.

*Nitrate of Lead* has been successfully employed by Sir William MacCormac as an astringent in onychia and inflamed conditions of the nail. It makes an elegant astringent application, dusted in very fine powder over cracked nipples, and excoriations about the mouth or anus.

*Iodide of Lead* combines the alterative qualities of iodine with the astringent properties of lead. It is supposed to have a beneficial action in scrofula, but is seldom given internally.

Externally, it is used in the form of a plaster and ointment. The plaster can only feebly produce any alterative action independent of the good effects of pressure, and covering up and protecting the part from changes of temperature. (See below.) The ointment can scarcely be said to be more active, as there is no evidence of its entering the system through the unbroken cuticle.

In cases of herpes circinatus, which are produced by the direct contagion from the cow, and which prove so very difficult to treat in the human subject, the iodide of lead ointment is a most efficient remedy, and, though not so certain as the corresponding salt of sulphur, it is much less irritating, and, consequently, may be applied more frequently to irritable skins.

The various plasters containing lead most probably act entirely independently of their metallic constituent, which is not absorbed in this form into the system. The eleven preparations of which lead plaster forms the basis (except mercurial plaster) act mechanically, as before explained, by causing such pressure when properly applied as will alter the circulation, and, acting as a stimulus to the lymphatics, will assist the removal of effused products or indolent enlargements. By covering up the affected or diseased parts, they protect them from all sources of external irritation, especially from changes of temperature, and promote a more rapid interchange between the blood and the tissues, hastening repair, and, at the same time, in the the case of diseased joints, securing some degree of rest. It will be seen that the superficial spot so treated, is placed upon the same favourable conditions as a deeper part.

☞ *Antidote.*—In cases of acute poisoning by lead salts, an emetic of sulphate of zinc should be promptly administered. This also acts as an antidote, forming the insoluble sulphate of lead; in its absence, milk and white of egg will form sparingly soluble albuminates. Phosphate of soda, Epsom, or Glauber salts may be freely given; the advantage of these latter is that they carry the insoluble sulphate directly out of the body by the purgation which they cause.

In chronic lead-poisoning a different course is necessary. Here our object is to dissolve out the almost insoluble metallic compounds lodged in the nerves, viscera, muscles, and brain. Iodide of potassium is the remedy suitable for this purpose, but its administration must be backed up with purgatives, especially saline sulphates. Sulphur baths may be employed, and the tone of the affected muscles must be kept up by friction and the free use of the slowly-interrupted current.

As prophylactic treatment to those much exposed to the fumes or dust of the lead compounds, lemonade made with sulphuric acid, instead of citric or tartaric, has proved very beneficial; and a diet largely composed of milk has the power of preventing the poison affecting the system. Scrupulous personal cleanliness in those working with the pigments of lead is a very important point.

**Podophyllum** root and resin are active cathartics. The latter is the form in which this substance is generally administered. It is an irritant when applied to the surface of the body; and the dust produced by powdering it coming in contact with the skin causes sores, and keeps the eyes in a state of chronic irritation. When given internally, the tongue and throat become inflamed in the same way, if the remedy is allowed to remain in contact with these parts for any length of time; but as ordinarily given, in the form of pill or even diluted tincture, this effect is not noticed.

It produces free purgation, with watery stools, by irritating the mucous membrane and acting as a powerful stimulant to the intestinal glands, whose secretion it greatly increases. The most of its force is spent upon the duodenum, whose contents it sweeps rapidly down the tube, resembling in this respect calomel; and hence the name frequently given to it of "vegetable calomel." The resemblance ends here, for podophyllin does not possess any of the *alterative* properties of calomel, as abundant clinical experience proves.

In its action podophyllin closely resembles jalap, only ordinary purgative doses (⅙ to ⅓ gr.) are more tardy in producing their effects, and are much more variable in their results upon different individuals. Sometimes ¼ gr. of the resin purges in a few hours, while ½ gr. in another individual will not operate for 10 or 14 hours, and in a third may produce no purgation at all. Florid individuals, or those with much red pigment in their hair, may be often noticed to be very susceptible to the action of this drug. Often great pain results from the administration of podophyllin, especially from impure samples of the resin; common salt increases its cathartic properties.

Next to its action upon the duodenum and intestinal glands, podophyllin has been proved by Rutherford to cause very decided stimulation of the liver, and produces marked increase in the amount of bile secreted. The bile is its proper solvent, but if large doses of the drug be given the hepatic secretion in which it is dissolved is not absorbed, but is swept along the intestines, and the liver is less stimulated than if only moderate quantities had been administered. It has been found, as the result of experiment, that in doses sufficient to cause severe purgation the biliary secretion is decidedly diminished.

These effects upon the liver and intestines give podophyllin a high place in the treatment of various diseases of the liver and bowel; thus for passive congestion or hepatic torpidity, or obstinate constipation, ¼ gr. of the resin will be found a valuable remedy, relieving the portal circulation speedily. The danger of griping will be removed by the addition of extract of belladonna or hyoscyamus; but, as a rule, it will be found advisable, when the purgative effects of podophyllin are required, to order it with some good cathartic pill, as aloes or colocynth, by which means its action is much more certain and uniform.

The resin may be given dissolved in rectified spirit one grain in every dram, or it may be injected hypodermically, taken as a powder, or used as a suppository; but, as a rule, made into a pill is the most suitable manner in which to administer the drug.

By such a combination of purgatives as colocynth, podophyllin, jalap, and aloes, we get a more valuable hepatic stimulant than if any one be ordered singly in a larger dose. By this means we also insure an action possessed by no solitary drug, since the entire intestinal tract from the stomach to the anus is equally stimulated.

℞.

*Extracti Hyoscyami gr.*iiss.

*Resinæ Podophylli gr.*¼.

*Ext. Aloes Barbadensis gr.*iss. *misce.*

*Fiat pil. mitte tales* xii. i. *pro re natâ, hora somni.*

Or,

℞.

*Resinæ Podophylli gr.*ij.

*Extracti Belladonnæ gr.*ij.

*Pil. Rhei Co. gr.*xxx. *misce.*

*Fiat massula divide in pilulas* viii. *quibus sumatur una tertia quaque nocte.*

*(For Sick Headache.)*

℞.

*Spt. Vini Rectif.* ʒiv.

*Resinæ Podophylli gr.*iij. *misce.*

*Fiat solutio cujus capiat gt.* x *bis in die ex paululo aquæ.*

Or,

℞.

*Resinæ Podophylli gr.*iv.

*Tinct. Zingiberis* ℥iij. *misce.*

*Fiat mist. cujus cpt. cochleare minimum hora somni ex cyatho aquæ.*

**Potassium**—The salts of potash vary so much in their therapeutic action that a brief account of each separately will be necessary. They possess some properties in common; thus all act in *large* doses as powerful poisons independent of the acid with which they may be chemically combined. The spinal cord is paralysed, and its reflex sensibility is destroyed; the heart is depressed, and its movements rendered slow and irregular.

One large dose of any potash salt injected into the veins of an animal causes sudden arrest of the heart's action and death. The experiments of Ringer show that probably the potash salts act as pure protoplasmic poisons, destroying *all* nitrogenous tissues, the more highly organised nerve centres suffering first.

After a time the blood becomes thin and poor when the administration is protracted, and there is generally great loss of weight from absorption of the fat deposited throughout the body. In small doses these salts are restorative, supplying the place of those used up in the blood corpuscles and in muscle. Most of them are diuretic and slightly purgative. All possess high diffusive power and readily enter the blood. There are, in many points, close resemblances between the potash and soda salts, and they may be taken as the representatives of a very important chemical class of therapeutic agents—the alkalies.

Brunton has shown that the alkalies when admitted to the stomach act as direct stimulants, and notably increase the quantity of gastric juice when given before food; and thus their utility in atonic dyspepsia, and their power for harm in irritative gastric complaints with excessive acid secretion. Ringer's law in reference to acids holds true conversely when applied to alkalies which he believes check all alkaline secretions, while they stimulate all secretions of an acid reaction.

**Potassa Caustica**—From its affinity for water, and its power of dissolving albumen, this substance when applied to the tissues causes their rapid destruction, producing an extensive eschar. Its destructive action being both deep and wide, its use must be restricted to such parts where no vital organs or structures are within reach. Its deliquescent properties cause it to run over the skin if allowed to remain in contact with it long; hence it is desirable to circumscribe its action with a ring of adhesive plaster, or with some adhesive cerate of firm consistence.

When the solid stick is applied to the skin for the destruction of any very superficial part, a contact of short duration will suffice, and blotting-paper should be applied to absorb the moisture, else the eschar will be much deeper than is intended. Cancers of epithelial origin may be often satisfactorily treated in this way. It was the manner in which the old-fashioned issues were established, and is still employed in opening some abscesses or cysts in the interior of the abdomen, or in the substance of the liver. A series of mild applications of the caustic excites such inflammation that the abscess or cyst wall becomes glued to the abdominal parietes, when it may be opened with the knife or with further applications of the caustic without any danger of the contents escaping into the peritoneal cavity. Unhealthy, foul ulcers showing a tendency to spread by sloughing may be destroyed with caustic potash, and its efficacy in various chronic indurated conditions of the os uteri is highly spoken of. In these cases the good effects are not so much owing to the destruction of diseased tissue as to the alteration in the diseased action which always follows the free use of the caustic. The caustic, apparently, acts as a powerful stimulant to the healthy tissues, hastening repair and growth, and substituting a healthy inflammation for some abnormal tissue change.

The deliquescent properties and severity of action peculiar to caustic potash are corrected by mixing it with rather more than its own weight of lime, and making it into a paste as required with rectified spirit of wine. In this form it is known as Vienna paste—a safer, milder, and more manageable remedy than the pure caustic potash. Internally, this substance is never given in the solid state, since small quantities would act like the powerful corrosive poisons, and cause death by destroying the mucous membrane of the stomach and gullet, somewhat after the manner of the strong mineral acids.

☞ *Antidote*—Acids diluted, especially the vegetable acids, which may be given freely. Oil acts as an antidote by combining with the corrosive alkali, and forming a harmless soap. Owing to the softening and destruction of the coats of the gullet the stomach-pump should not be used.

**Liquor Potassæ** is the form in which caustic potash is administered internally, though if given in its undiluted strength it is a powerful corrosive poison. Applied to the cuticle it dissolves it, and is used as a remedy for in-growing toe-nail, with a view of softening the nail and facilitating its removal. As a lotion it is likewise useful in skin affections, where it may be employed with two distinct intentions, either to partially dissolve or hasten the removal of scales, as in psoriasis, or to allay the itching (by its alkaline property) of various conditions, like eczema, urticaria, &c.

Internally, when Liquor Potassæ or any solution of the hydrate (largely diluted) is swallowed it readily finds its entrance into the blood on account of its easy diffusibility, but it first neutralises any free acid with which it comes in contact in the stomach; it acts thus as an antacid, either locally or after its admission into the blood.

Hence it may be used when we wish to check excessive acidity anywhere, as in irritative dyspepsia, or acid conditions of the urine leading to uric acid deposits; but if given in doses sufficient to produce this remote antacid effect it will be often found to irritate the stomach, and consequently it is not so valuable as the less irritating salts. It is diuretic to some extent, as it passes out by the kidneys, but it possesses less power (in safe doses) over the state of the urine than the citrates and carbonates. Liquor Potassæ does, however, cause an increase in the nitrogenous elements of the urine, possibly by encouraging the various tissue changes or destructive metamorphoses throughout the body, and not by any mere diuretic action of the drug.

The liquor appears to possess special sedative influence over the bladder and urethra, and its use in various irritable conditions of these parts, caused by unhealthy urine passing over them, is more liable to be followed by good results than if any of its salts had been given, the bicarbonate excepted.

Small doses, given with a vegetable tonic before meals, possess considerable power in increasing the flow of the gastric juice by acting as a direct stimulant to the mucous membrane, in the same way that acids given before meals correct or prevent the excessive secretion of acid juice.

*(In Atonic Dyspepsia.)*

℞.

*Liquor. Potassæ m.* lxxx.

*Infus. Calumbæ* ℥vii*ss.*

*Tinct. Aurantii* ℥*ss. misce.*

*Fiat mistura, cujus capiat cochleare amplum ter in die ex aquâ ante cibos.*

**Potassa Sulphurata** possesses the properties of the sulphur compounds in a more marked degree than those of the potash salts, and will be referred to under Sulphur.

**Potassæ Acetas, Citras, and Tartras**—These salts, in moderate doses (about 30 grs.), enter the blood speedily. They circulate along with it, acting as restoratives to the corpuscular elements and muscles and the various tissues containing potash salts; reaching the kidneys the excess is excreted in the urine. Before passing out of the body the salts of potash, with vegetable acids, are converted into carbonates or bicarbonates, increasing the alkalinity of the blood and rendering the acid urine, alkaline. This alkalinity of the urine results even if the salts contain an excess of acid, and occurs after the use of the acid tartrate; and since they possess no local corrosive action, but may be taken in doses ten to twenty times larger than is necessary to produce their diuretic effect, they may be administered freely, and for a long time if necessary. Though the reaction of the urine is thus altered from acid to alkaline, still the *total* quantity of acids in a state of combination secreted by the kidney may be augmented.

In this way the urine may be kept alkaline for many weeks, and there is evidence that during that time small uric acid stones in the kidney may be dissolved or so reduced in size that they may pass down the ureter and be expelled through the urethra. It is thus evident that the reputation which these salts have earned for themselves as antilithics rests upon a solid foundation, but their diuretic powers are not so well recognised. In health they often fail to increase the amount of urine.

In large doses, the tartrate, citrate, and acetate of potash, act as purgatives, from ¼ to ½ oz. in solution, being generally enough to cause mild catharsis, and this is probably the result of the elimination of the salts by the intestinal glands, which are thus stimulated to pour out increased quantities of intestinal fluid. The skin is acted upon by small doses, and this affords a *possible* explanation of the refrigerant or febrifuge qualities which these salts are supposed to possess. They open up the cutaneous circulation by causing dilatation of the superficial capillaries, and the resulting perspiration offers one way for the extraction of heat from the body. It is, however, probable that at the same time they cause such alterations, either in the density or composition of the blood, as prevent or retard the changes taking place in that fluid upon which the increased temperature of the body may depend.

In acute rheumatism these salts are found beneficial; by increasing the alkalinity of the blood they counteract the effects of the rheumatic poison, and thus reduce the body heat and assist in the cure of the disease. Their antacid properties do not, however, account for all the good they do in acute rheumatism, for they probably exercise a *sedative* influence over the nervous system, though it is by no means clear that they materially shorten the length of the attack. (See Potassæ Bicarbonas.)

The *acetate* of potash is the most certain diuretic of the vegetable potash salts; the *citrate* is the most reliable diaphoretic; whilst the *acid tartrate* possesses the most pronounced cathartic properties. The citrate is more commonly ordered than any other potash compound, since it is this salt which is formed when the carbonate or bicarbonate is administered in effervescence with lemon juice. In this form the citrate is an elegant gastric sedative, and is beneficial in irritable conditions of this organ; with the addition of a little morphia no combination gives such relief in phthisis when the skin is hot and dry, the cough harassing, and the tongue furred. The good effect in such cases is to some extent owing to the carbonic acid gas coming in contact with the peripheral nerves of the irritated mucous membrane. These salts of potash have been highly recommended as restoratives in scurvy, by those who believe that the disease is caused by a deficiency of potash in the system.

℞.

*Potassæ Acetatis* ʒiss.
*Liq. Ammon. Acet.* ℥ij.
*Syrupi Aurantii* ℥ss.
*Aquæ Camphoræ ad* ℥viij. *misce.*

*Fiat mistura, cujus capiat cochlearia duo ampla quartis horis.*

℞.

*Potassæ Citratis* ℥ss.
*Syr. Flor. Aurant.* ʒiv.
*Spt. Æther. Nit.* ʒiv.
*Aquæ ad* ℥viij. *misce.*

*Sumat cochleare amplum tertiis horis.*

The acid tartrate may be given with sliced lemon in hot water, sweetened with a little sugar. Its purgative power is increased if it be administered in less water than will dissolve it; and there are few more agreeable laxatives than a paste made of cream of tartar and orange marmalade The mildness of its operation recommends its use in the reflex constipation caused by painful hæmorrhoids, in which cases it may be combined with sulphur, as in the official confection, or it may be given with marmalade.

℞.

*Potassæ Bitart.* ℥j.
*Sulphuris* ℥ss.
*Conserv. Aurantii (Keiller)* ℥iv. *misce.*

*Fiat electuarium, cujus capiat cochleare magnum omni mane nocteque.*

**Potassæ Carbonas**—There is little difference in the action of the carbonate of potash and the liquor potassæ. It is corrosive to some extent, and a large dose causes death by destroying the tissues with which it comes in contact, though its effects are not so severe as are those following caustic potash or the liquor. It is seldom given in medicine, the bicarbonate possessing all its virtues without its irritative qualities. It readily enters the blood, in which it remains as carbonate; and it passes through the body being eliminated unaltered and appearing as carbonate in the urine, which it renders alkaline. It is diuretic, antacid, and antilithic.

Externally, it often gives good results by checking the acrid secretion of weeping eczemas and the itching of urticaria and other skin affections.

☞ In poisoning, the same antidotes as are used to counteract the effects of the hydrate may be employed—*i.e.*, dilute acids and oil.

℞.

*Potassæ Carbonatis gr.*xl.

*Glycerin.* ʒiij.

*Aquæ Rosæ* ℥xvj. *misce.*

*Fiat solutio. Signa, "To be used as a lotion, sprinkled on lint, and laid on the affected spots."*

**Potassæ Bicarbonas**—This salt possesses all the virtues of the potash compounds, without any local corrosive or irritative action. It is a mild antacid; given in small doses, it stimulates the secretion of the gastric juice before taking food, and thus is beneficial in atonic dyspepsia. In painful gastric affections accompanied by excessive secretion of acid and acrid fluid after meals, if administered in large doses, it counteracts acidity, and often gives instant relief, though its continued administration in such cases is not productive of permanent benefit. In cases of simple gastralgia or cardialgia not evidently depending upon excess of acid secretion, the bicarbonate often gives relief by its local soothing or sedative action, possibly by giving off carbonic acid gas as it comes in contact with acids.

It makes the blood more alkaline, and is excreted as carbonate by the kidneys, which it stimulates. Passing over the mucous membrane of the genito-urinary tract, it either exercises its direct sedative influence, or else, by rendering the urine less irritating, it soothes the inflamed surfaces in cystitis, gonorrhœa, pyelitis, &c. It may well be combined in such cases with buchu, pareira, or hyoscyamus. If the urine be already alkaline and decomposing, causing irritation by the rapid formation of ammoniacal compounds in the bladder, the potash salts may do harm if persisted in. If the irritation is caused by the presence of an abnormal amount of uric acid, then the carbonate or bicarbonate gives speedy relief.

There is some evidence to show that good results may be obtained by the injection into the bladder of alkaline solutions with the intention of dissolving small uric acid calculi.

There is much difference of opinion about the usefulness of the alkaline treatment in acute rheumatism; but though it may be considered that evidence is wanting to prove that this treatment possesses the power of cutting short the disease, still it is a well-recognised fact that the alkalies afford marked relief in this affection, and the danger of cardiac complication is lessened. It is possible that the beneficial effects of the drug do not depend upon its neutralising the supposed excess of uric acid in acute rheumatism, but from its so altering the composition of the blood that the changes in this fluid, caused by the rheumatic poison, are less easily effected.

In rheumatoid arthritis and chronic rheumatism good results are found from the free administration of the bicarbonate if combined with the iodide of potassium.

It should be remembered that the alkalies, when given for a long time in medicinal doses, cause deterioration in the quality of the blood and diminish the weight of the body; and thus a tardy convalescence may result after the disease for which they are administered, is cured.

The best form in which to give the bicarbonate of potash is effervescing with lemon juice, one tablespoonful of which will be found to neutralise 25 grs. of this salt; but the alkali may be in any excess that the physician considers his case demands. Thus, in acute rheumatism we may order:—

℞.

*Potassæ Bicarbonatis* ʒxij.

*Aquæ Destillatæ* ℥xij. *misce.*

*Fiat mist. cujus capiat cochlearia duo ampla tertiis horis in effervescentiâ cum succi limonis recentis cochleare amplo.*

A solution of citric acid may be used as a substitute for fresh lemon juice when the fruit cannot be obtained, but the natural juice is always to be preferred.

The following form makes a good substitute:—

*(Artificial Lemon Juice.)*

℞.

*Acid. Citric. gr.*ccx.
*Mucilag. Acac. Recentis* ʒiij.
*Syrupi Simplicis* ʒj.
*Aquæ Destillatæ ad* ℥vj. *misce.*

*Fiat mist.*

The official effervescing solution may be freely given with milk, and is often retained by the stomach when other foods are rejected.

**Potassæ Bichromas** is introduced into the Pharmacopœia to make valerianate of soda, and practically only possesses pharmaceutical or chemical interest. It formerly was used for its supposed alterative action in syphilis, resembling mercury in therapeutic effects, but it is seldom, if ever, now prescribed. Occasionally it is employed as a caustic in the form of a saturated solution, brushed over superficial growths, especially of a syphilitic character. ⅛ gr. would be an average dose of this drug; two or three grains will act as an emetic.

**Potassæ Chloras**—Few remedies have been credited with so many virtues, but since the knowledge that chlorate of potash passes for the most part through the system unchanged without parting with its oxygen, its uses have been somewhat restricted; and some authorities have been led erroneously to state that it produces no appreciable effect in the system after its admission into the blood.

In moderately large doses (20 grains) it stimulates the kidneys, as it is excreted by them, and appears in the urine unchanged. This effect will be found to be perhaps more constant than that of most other diuretic medicines; and it seems to act powerfully upon the kidneys if administered during pregnancy. In poisonous doses (1 oz.) it causes active congestion of these organs, with bloody and finally suppressed urine.

It is, however, for its influence over unhealthy mucous surfaces that this remedy will always keep a high place in therapeutics. This effect is witnessed when a solution is applied to the spongy gums in various aphthous conditions of the mouth and throat, and in active inflammations of the tonsils and mucous lining of the pharynx and nares. A rational explanation of its action in these cases has yet to be given, and we must fall back upon such a term as "alterative" to explain its beneficial effects, for it seems by its local influence to alter in some way the unhealthy action of the membrane. One effect may be constantly observed when chlorate of potash is used as a gargle in follicular pharyngitis or acute tonsillitis. Marked benefit at first follows its use, but if it is persevered in for any length of time, it keeps up a chronic irritation, which subsides only after its use is withdrawn. It appears to have an influence over the salivary and buccal glands, like what it has been observed to exercise over the mammary—viz., it checks or moderates their secretion if excessive, and stimulates or increases it if scanty. It has been highly spoken of in excessive salivation from the injudicious use of mercury.

After its absorption and entrance into the blood it appears to exercise the same alterative, stimulating, or regulating power over other mucous surfaces, especially the intestinal. In diseases of childhood, depending upon catarrhal and other unhealthy inflammations of the mucous membrane of the alimentary canal, from the mouth to the anus, the writer has found this drug invaluable.

In scrofula and various states depending upon a depraved or impoverished condition of the blood chlorate of potash has been highly spoken of, though it appears possible that many of its good effects in these cases may depend upon the iron which is so constantly combined with it.

A solution of about 6 grs. to each fluid ounce of distilled water is a satisfactory application to unhealthy sores and ulcers, and may be used for washing out foul sinuses or cavities, and will be found a valuable stimulant in various chronic affections of the bladder, if injected twice a day. The powdered salt may be applied to aphthous spots on the cheeks, tongue, or gums. Small pieces slowly sucked in the mouth, by reflex action excite effectually the secretion of healthy mucus in chronic bronchial and laryngeal affections, so that the expectoration is rendered more fluid or less adhesive, and is readily swept up by the cilia; hence this salt is classed as a ciliary excitant.

Internally, it acts often beneficially as an expectorant in chronic bronchitis, when given with hippo or senega.

Recent experience is showing that chlorate of potash is not so inert as has been supposed; already many cases of poisoning having occurred on the Continent, and some from taking doses under 1 oz.

☞ The best treatment is the free use of the stomach pump and emetics, followed by profuse demulcent drinks and hot baths. Direct stimulation of the skin should be persisted in to encourage perspiration and relieve the kidneys, whose functions may be soon in complete abeyance if the poison be not eliminated through some other channel.

*(Gargle.)*

℞.

*Potassæ Chloratis* ʒiss.

*Aquæ Rosæ* ℥ij.

*Aquæ ad* ℥x. *misce.*

*Fiat gargarisma, sæpe utendum.*

*(Mixture.)*

℞.

*Potassæ Chloratis* ℥j.

*Tincturæ Ferri* ℥ss.

*Glycerin.* ℥iss.

*Aquæ ad* ℥xx. *misce.*

*Fiat mistura, cujus cpt. cochlearia duo ampla ter quotidic ex cyatho aquæ.*

*(Lotion.)*

℞.

*Potassæ Chloratis* ʒj.

*Spirit. Vini Rectif.* ℥j.

*Aquæ ad* ℥x. *misce.*

*Fiat lotio. Signa, "To be poured on lint and applied to the sore or wound, and covered with oiled silk."*

**Potassæ Nitras**—The salts of potash, with the mineral acids, differ materially from the vegetable acid salts of potash, in passing through the system and being eliminated unchanged in the urine, while the latter are converted into carbonates.

The nitrate is a very active substance; it rapidly enters the blood, and in large doses prevents its coagulability by its action on the fibrine. It so alters the red blood corpuscles that they soon cease to possess any power of carrying oxygen to the tissues. The first effect upon the heart is to render it slower in its movements; afterwards it becomes so quick and weak that it finally stops. Death may result from the violent irritant action of the salt on the alimentary canal giving rise to severe vomiting and purging.

The salt is eliminated by the kidneys, during its passage through which it acts as a stimulating diuretic, appearing in the urine as nitrate. The skin is acted upon, this salt possessing very constant diaphoretic powers, which are increased if it be administered in some hot fluid at bed-time. A glass of whiskey or brandy, with boiling water and sugar and half a dram of nitre, affords a good chance of getting the hot skin to secrete abundant moisture in febrile affections, while it slightly reduces the pulse, and the temperature falls a little.

This refrigerant action of nitre is generally explained by its sedative influence over the circulation and its effect upon the skin. It is a favourite diaphoretic and diuretic in all inflammatory affections, except where the gastro-intestinal or renal apparatus is involved. It is, probably, partially excreted by the bronchial mucous membrane, over which it appears to exercise an influence not unlike that which it effects on the skin, and it is a very reliable expectorant. It appears to be most useful when the irritation or inflammation is confined to the trachea or larger divisions of the respiratory tract. Bibulous paper soaked in a strong solution of nitre, dried, and allowed to burn slowly in the patient's room, has been long a favourite remedy in asthma.

The nitrate may be given with great advantage in a mixture of the citrate or bicarbonate in effervescence.

℞.

*Potassæ Bicarbonatis* ʒv.

*Potassæ Nitratis* ʒij.

*Aquæ Destillatæ* ℥xij. *misce.*

*Fiat mist. cpt.* ℥i. *cum* ℥*ss. succ. limonis tertiis horis.*

**Potassæ Sulphas** is used in Pharmacy to assist in the subdivision of the particles of powders and pill masses to insure their uniform separation, and it is supposed that by so doing the particles are more active. It is a mild cathartic, acting by increasing the intestinal glandular secretion, and is especially suitable for children. The experiments of Rutherford prove that it is a decided hepatic stimulant, though sometimes uncertain.

It may be given in teaspoonful doses in a tumblerful of cold water.

**Potassæ Permanganas** is a powerful oxidiser, readily parting with its oxygen, which, on being freed, forms harmless compounds with foul smelling gases and liquids, thus acting as a very efficient deodoriser. In a similar way it destroys the germs of disease, and thus is a disinfectant. It makes an elegant and not unpleasant gargle in fetid ulcerations about the gums, mouth, or throat, in the proportion of about 1 grain of the salt or two drams of the official solution in 10 oz. of distilled water. This weak solution may be also used as a lotion to foul ulcers, or as an injection into suppurating cavities and sinuses, as in ozæna and empyema, or as an injection in cancer of the os uteri. It should never be ordered in company with any other drug, but be invariably prescribed with distilled water, and kept in stoppered bottles.

Internally, the permanganate is seldom given on account of the rapidity with which it is decomposed in coming in contact with the animal tissues or fluids.

It has, however, been given in grain doses in diabetes.

**Potassæ Prussias Flava** is only employed to make prussic acid.

**Potassii Bromidum and Iodidum.** (See under Bromum and Iodum.)

**Prunum**—The dried plum is seldom employed as a medicine, but is freely used in domestic life as a food and sweetmeat. It possesses faint laxative properties, and when stewed makes a tempting dish for constipated children. It probably acts by increasing the peristaltic movements of the intestinal tube.

**Pterocarpi Lignum** has faint astringent properties, probably depending upon traces of tannic acid which it contains. It is used solely as a colouring agent; and in the compound tincture of lavender, to which it imparts its beautiful red colour, it is prescribed to render colourless or unsightly mixtures more attractive.

**Pyrethri Radix** may be taken as the type of a class of remedies called sialagogues, which increase the quantity of the salivary secretion. When chewed in the mouth, pellitory acts as a powerful stimulant to these glands, causing a sudden increase in the quantity of saliva by its direct irritant action. It has been thus used to relieve the pain of carious teeth, and as a masticatory in paralysis of the tongue and relaxation of the uvula. Its pain-relieving properties are very uncertain, though the tingling and unpleasant sensation which it causes in the mouth will always to some extent mask pain; and it appears to blunt the sensibility of the nerves distributed to the lining membrane of the mouth.

The writer has found it useful as a rapid method of having iodine eliminated from the system.

The tincture may be used as a mouth-wash in the proportion of a teaspoonful to a wine-glassful of water; or it may be applied in its undiluted state on cotton wool to the cavity of the diseased and painful tooth.

**Pyroxylin** is employed in making Collodion (which see). It is not used internally.

**Quassia** is a pure bitter tonic, devoid of astringency; it is used in dyspepsia and anorexia. Under "Calumba" its mode of action is explained. It closely resembles calumba, and, like it, may be given with the preparations of iron, since it contains no tannin.

It possesses toxic properties when eaten by flies and fish, and has been supposed to act in a similar way in various diseased conditions of the blood, destroying unhealthy organisms, and acting as a true febrifuge, like quinia; but only very doubtful success has resulted when thus administered, possibly because too small a dose has been used. When injected into the rectum a strong infusion will cause the death of the thread-worm.

℞.

*Infus. Quassiæ ad* ℥xij.
*Tinct. Quassiæ* ℥j.
*Tr. Ferri Perchloridi* ʒij. *misce.*

*Fiat mist. cujus capiat cochlearia duo ampla ter in die.*

**Quiniæ Sulphas.** (See Cinchona.)

**Quercus Cortex**—Oak bark is a valuable astringent, owing to the amount of tannin which it contains—(see under Acid. Tannicum)—and it may be given internally wherever an astringent is indicated, though it is generally used as an external application. The decoction makes a useful, though not very elegant *gargle* in relaxed sore throat and spongy gums; or a *lotion* to flabby ulcers and profusely suppurating wounds; or an *injection* in gonorrhœa, leucorrhœa, and prolapsus ani.

In passive diarrhœa half a wine-glassful may be taken after each loose motion.

R.

*Alum. Sulph.* ʒiij.

*Decoct. Quercus* ℥xij. *misce.*

*Fiat mist. cujus capt. cochleare amplum ter in die.*

**Resina** is not administered internally. It owes its position in medicine solely to its adhesive property and to its power of making various fatty mixtures of suitable consistence for ointments.

It has, however, feeble stimulating qualities, and is much used when made into an ointment with wax, lard, and oil as a mild stimulant to sluggish ulcers and slowly healing wounds; it appears to act in such cases by causing enough irritation to slightly increase the blood supply; at the same time it protects the ulcerated or wounded surface from the action of the atmosphere.

Resin is used in making various plasters, and blistering paper, to which it imparts its adhesiveness.

**Rhamni Succus** is a powerful purgative, causing profuse watery motions, attended with much griping pain, and occasionally accompanied by the secretion of gas in the intestines.

It acts by stimulating the intestinal glands to pour out their watery secretion, and it thus extracts much fluid from the blood; and its use is consequently indicated in dropsies. The muscular movements of the intestine are also quickened by buckthorn; and it would appear that it is prone to cause irregularity in these movements or contractions which renders the patient uncomfortable while under its influence. The severity of its action, and the intense thirst which it produces with the amount of pain occasionally following even a moderate dose of the drug, have caused it to be seldom employed. The syrup is the form in which it should be used, and a teaspoonful is a fair dose. It has been said to possess feeble diuretic properties. It is occasionally added to other purgative medicines to increase their effect.

**Rhatania.** (See Krâmeria.)

**Rhei Radix**—Rhubarb when administered in small doses (2 to 5 grs.) acts as a stomachic, increasing the quantity of the gastric juice, improving the appetite, and assisting digestion, and the tincture has been long used as a tonic. It soon finds its way into the blood, and, acting as a stimulant to the liver, or to that portion of it whose duty it is to secrete bile, it increases the quantity of this fluid without diminishing any of its ingredients. This cholagogue action of rhubarb is entirely independent of any cathartic effects, as the results of experiments prove that the amount of the bile can be markedly increased in fasting animals without the bowels being disturbed.

In large doses (20 grs.) its cathartic properties are rendered apparent, and it produces mild purgation by stimulating the muscular movements of the intestinal tube from the duodenum to the rectum. It also acts, though to a small extent, as a mild stimulant to the intestinal glands, and slightly increases their secretion. In doses of 60 grs. the intestinal fluids are considerably augmented.

Rhubarb after exercising its cathartic power becomes an astringent, and checks the alimentary secretions, causing subsequent constipation; and consequently it is not an advisable purgative for patients suffering under chronic constipation.

Its astringent properties depend upon the amount of tannin which it contains, and which affects the bowels only after the cathartic effect passes off. This renders it highly valuable in diarrhœa where we wish to produce an astringent effect after getting rid of some irritating food or matters remaining in the canal.

In hæmorrhoids few remedies will be found so useful as rhubarb, and some consider it much more efficacious if slowly chewed in the mouth; but in any case its great disadvantage is its astringency, which, in this affection, is entirely counteracted by two to four dram doses of olive oil taken every night, floating on a little milk.

The stools are at first rather dark, owing to the increased bile, and colouring matter of the rhubarb; they are afterwards found to be paler than natural, owing, as is supposed by Harley, to the subsequent astringent action of the rheo-tannic acid on the the liver. The colouring matter of the rhubarb is found in the perspiration, milk, and urine, but chiefly in the latter.

An equal quantity of bicarbonate of soda is said to overcome the astringent properties of rhubarb and disguise its taste; and it may be so ordered as a powder in teaspoonful doses in water.

It should be ordered with some substance like magnesia, as in the celebrated Gregory's Powder or official Pulv. Rhei Co., which may be given in milk; and is an invaluable cathartic in the various gastric and abdominal troubles of childhood. The syrup is well suited for children, the coriander partially concealing the flavour. The following form will be found a good one for producing the stomachic effects of rhubarb, though some prefer to substitute peppermint for the essence of aniseed :—

℞.

*Pulv. Rhei* ʒ*iss.*
*Syrupi* ℥j.
*Spt. Chlorof.* ʒiij.
*Ess. Anisi m.* xx.
*Aquæ ad* ℥viij. *misce.*

*Fiat mistura. Signa, "A small tablespoonful as a tonic or stomachic, or a wine-glassful as a purgative."*

If a combination of rhubarb with an active cathartic is required, the official pill in 10 gr. doses will be found to answer all purposes. The extract, or the powder made into a pill with a little glycerine, is the best form in which to administer rhubarb when we wish to have its effects without the influence of any other drug.

℞.

*Pulv. Rhei gr.*liv.
*Glycerin. m.* xij. *misce.*

*Fiat massula, in partes* xii. *divid. St.* ii. *ter in die.*

**Rhœados Petala** possess feeble narcotic qualities—so feeble, indeed, that many doubt the slightest anodyne action of the syrup of red poppies. Though it is impossible to get any traces of morphia when submitted to chemical examination, still the characteristic effects of opium have been noticed when this preparation has been given to very young children or infants. Nevertheless, it is only for its colouring properties that this syrup can be said to be used in medicine.

**Ricini Oleum** is a mild cathartic, by some authorities classed as a laxative. If rubbed into the skin of the abdomen in presence of a heat above that of the body, or if injected into a vein, swallowed, or thrown into the rectum, castor oil produces the same effect upon the intestines. The intestinal glands are slightly stimulated, and the vermicular contractions are increased in frequency and power, especially in the duodenal part of the canal, the result of which is, that in about six hours several very soft but not watery stools are passed with little pain and no constitutional disturbance. The oil passes out by the bowel in a slightly altered condition, but it may be recognised in the secretion of the mammary gland by its purgative effects upon the infant.

It possesses no power over the hepatic secretion, and appears to lose its influence after a time; and in some cases its administration seems to be followed, like rhubarb, by an astringent effect. In pregnancy, where it is a very safe purgative, large doses may be required if regularly and constantly employed; and it is strange that sometimes in these cases if the large dose (1 oz.) be withheld, and only one or two teaspoonfuls given, the drug appears to regain its power, and to purge freely. The writer has satisfied himself that often the oil greatly assists the nutritive process and increases markedly the weight of the body, being, in those cases where it is tolerated, capable of producing results like cod-liver oil.

Its bland qualities render it a favourite and safe purgative for young children and infants, and in cases of pelvic disease. In the diarrhœa of infancy it is a prized medicine, acting by causing the expulsion of all irritating matters, without increasing in any way the general irritation.

In fæcal accumulations, castor-oil has long held a high reputation; but too great stress cannot be laid upon the rule, that it should not be depended upon without the aid of enemata of large quantities of warm water.

Accumulations of the rind of fruits (especially of gooseberries), so often found in children, are not advantageously expelled by castor-oil, as is supposed. More energetic cathartics are required, and calomel is especially useful in such cases. A drop of castor-oil allowed to fall upon the conjunctiva is a soothing protective when a foreign body has found its way under the lids.

The unpleasant flavour and sickening, greasy, taste of castor-oil is a great hindrance to its use, and various methods have been resorted to by the physician, dispenser, and nurse to hide its nauseous qualities. If ordered alone, it may be administered when it reaches the sick chamber by floating it upon a little wine or spirit in a glass, without being permitted to stick to its sides. In whatever form administered, the patient should bolt it quickly; some patients take it in orange juice, coffee, water, or gruel.

Directions are frequently given to float the dose between different strata of liquids. This is not practicable. Perhaps the best of all methods is to pour some *thick* cream into a very clean wine-glass, turn it round, so that the sides get smeared well over, pour in a tablespoonful of castor-oil, and a little cream on the top. The patient, having taken a teaspoonful of cream into his mouth, and caused it to come in contact with his palate by the movement of his tongue, is directed to swallow at a gulp the oil and cream out of the wine-glass, throwing back his head, that they may the more readily pass over the tongue. If not taken in this way, castor-oil should be *gently* warmed before being administered, as it is rendered thus more liquid and less adhesive.

The attempts to prescribe this drug in the form of an *emulsion* are generally failures, and liquor potassæ should not be used. If a castor-oil draught is ordered by the physician, he should endeavour to make it of as small bulk as is possible.

℞.

*Olei Ricini* ʒiv.
*Mucilaginis* ʒiij.
*Olei Limonis gt.*ij.
*Aquæ* ʒiij. *misce.*

*Fiat haustus.*

Children bear large doses well, and a small teaspoonful is often administered to newly-born infants without producing unpleasant effects. As a rule, never more than half an ounce should be administered for the first time to an adult, and often two drams will be found enough.

One to two ounces, with as much mucilage of starch, may be injected into the rectum.

**Rosæ Caninæ Fructus**—in the form of confection—is used as a basis for pill masses and electuaries. It is useful for working up insoluble powders, especially of vegetable origin, into the pilular form. It possesses two disadvantages as an excipient—viz., the free malic acid which it contains is liable to decompose many metallic salts, and it generally increases the bulk of the pill to a very undesirable extent. It forms the basis of the official pill of quinia, and, since it contains no tannic acid, may be freely combined with salts of iron. Hips can scarcely be regarded as having any therapeutic properties, though the confection has occasionally been ordered as a refrigerant and astringent, and even as a laxative.

**Rosæ Centifoliæ Petala** are only used in the form of otto or rose water for the sake of their delicious perfume. The water may be used as the basis of eye-washes and lotions especially for the face, where its fragrance renders it particularly acceptable.

**Rosæ Gallicæ Petala**—The petals of the red rose possess astringent properties if collected before their expansion, as the Pharmacopœia directs. Their astringency depends upon the small quantities of tannic and gallic acids contained in them, and is not so very decided as to warrant the use of the drug in the presence of so many vauable official tannates.

The infusion made with dilute sulphuric acid and water is an elegant method of administering the mineral acid, and may be made the basis of many agreeable mixtures. Its activity depends upon the tonic and astringent properties of sulphuric acid, and it may be given freely where this acid is useful, as in the hæmoptysis and sweating of phthisis, and as a gargle in relaxed sore throat. The dilute nitric acid may be substituted for the sulphuric with great advantage in suitable cases, as pointed out by Squire.

The confection of the red rose is used like the corresponding preparation of hips—to form the basis of pill masses and cough linctures. The syrup is never employed except as a colouring agent.

**Rosmarini Oleum** is a powerful stimulant when taken internally (which is seldom); it acts like peppermint and cajuput.

Externally, it is a valuable rubefacient, and is much used as an application to the scalp in baldness, where it is commonly supposed to exercise good influence over the nutrition of the hair-bulbs by increasing the supply of blood to the skin. Its efficacy is greatly increased by combining it with cantharides. It is often added to liniments on account of its odour.

The following is a valuable stimulant to the growth of hair:—

℞.

*Olei Rosmarini* ʒiv.
*Liq. Epispastici* ʒiss.
*Olei Amygdal. Dulc.* ℥iss.
*Spt. Camphoræ* ℥iiss.
*Glycerin. Boracis* ℥j.
*Otto de Rose gt.*viij.
*Tinct. Cinchonæ Flav.* ʒiv. *misce.*

*Signa. "A little to be rubbed into the roots of the hair every night after shaking the bottle."*

**Rutæ Oleum** is a strong rubefacient, and if applied to the skin with friction it will often cause vesication.

Internally, rue is not often administered; it acts as a powerful stimulant like rosemary, peppermint, and cajuput, and is occasionally used for its antispasmodic powers to relieve colic in 2 to 5 minim doses on sugar, or in a spoonful of whiskey, or in pill. It may be given in hysterical ailments, epilepsy, &c.

Rue possesses considerable power over the contractions of the uterus, and has been employed to produce abortion, and has caused death, preceded by symptoms of narcotic and irritant poisoning.

**Sabadilla** and its alkaloid Veratria are violent irritant poisons, producing vomiting and purging, with intense abdominal pain, convulsions, extreme muscular prostration, and loss of electrical irritability. These symptoms are caused by their action on the cord or muscles, most probably on the latter only, or on the terminal filaments of the nerves supplied to the muscular fibres.

Veratria applied to the skin, paralyses the filaments of the sensory nerves, acting as a local anæsthetic, and hence has been used as an application in the form of the official ointment to various neuralgic nerves. The best results have followed its use in the case of the fifth nerve, and it has been found useful in bad sciatica, and sick-headache, when rubbed over the affected or tender nerves. Its use is generally followed by some local irritation in the skin.

When veratria comes in contact with the nasal mucous membrane it acts as a sternutatory, causing distressing sneezing It also acts as an errhine, greatly increasing the secretion of the nasal mucous membrane.

Veratria is very seldom given internally—hellebore or veratrum viride being the remedy used, since it contains an alkaloid closely resembling the veratria obtained from sabadilla, whilst the latter drug is only used for preparing the alkaloid.

Veratria in moderate or large doses, as proved by many experiments, exercises at first a stimulating, and afterwards a paralysing effect upon the terminations of the pneumogastric nerve, and on the respiratory centre.

Veratrum viride, or green hellebore root, should not be confounded by the student with veratria, the alkaloid of sabadilla, though sabadilla and green hellebore resemble each other very closely, and the alkaloids of each are nearly identical, physiologically and chemically.

The tincture of veratrum viride produces effects like veratria when administered ; thus it often acts as a powerful drastic purgative, causing watery, painful, and bloody motions, resembling (as pointed out by Harley) colchicum in some of its effects, whilst its influence over the heart, which it first stimulates and afterwards soothes, has been likened to that of aconite. The pupil dilates, and the pulse under its use may fall to half its number, and is very much weakened in force. The muscles, at first rendered more irritable, become greatly prostrated, and voluntary movement is difficult, evidently from the direct action of the drug upon the nerve endings in the muscle or upon the muscular fibre itself. *Small* doses (3 minims of the tincture) appear to act like digitalis, by strengthening the contractions of the ventricle; and moderate doses (20 minims) in addition to reducing the pulse, cause nausea and often, vomiting. The body heat in health is scarcely affected; but, in febrile conditions hellebore undoubtedly reduces the temperature, though not to the extent believed by some of its advocates. It has been used in the treatment of fevers, acute rheumatism, gout, local inflammations, acute pleuritis, &c.; but, perhaps, the most promising results have followed its use in acute pneumonia, mania, and aneurism.

Its dangerous depressant effect on the heart, and its powerful irritant action on the alimentary canal, have prevented its use in this country.

Veratria, green hellebore, and sabadilla may be employed in powder or ointment to cause the destruction of pediculi; and the researches of Brunton show that their alkaloids possess power over the actions of the fermentive process in the body.

☞ *Antidotes.*—Tannin has been proposed, but its usefulness is very doubtful. Emetics, instantly and freely administered, followed by large doses of alcohol combined with laudanum, administered whilst the patient is kept in the recumbent posture, are the most rational lines to follow.

**Sabinæ Cacumina**—Savin is used externally as a rubefacient, and the oil, if applied for a sufficiently long time, will produce vesication. The official ointment is used as a dressing for blistered surfaces which are required to be kept discharging. The dried powder has been dusted over indolent ulcers and applied to warty growths with a view to excite mild inflammation.

Internally, the oil is the most active and satisfactory form in which to administer the drug. It rapidly enters the blood, from which it is excreted by the skin, pulmonary mucous membrane, and kidneys, the secretions of which organs it markedly increases, especially that of the kidneys, and occasionally its diuretic action is carried too far, causing bloody urine and strangury. The heart is somewhat stimulated by full doses, and the uterus is powerfully excited by large doses. This latter effect of savin is constant and marked, and produces better results than most emmenagogues.

To cause abortion (for which object this drug has been criminally administered), savin must be given in doses large enough to cause serious risk to life, in which cases it acts as a violent irritant poison, producing vomiting, purging, collapse, and death.

In amenorrhœa 3 minim doses of the oil may be found to establish the menstrual flow, after the ineffectual use of iron and ergot. Some have recommended the same treatment in menorrhagia depending upon a relaxed condition of the uterus. Subinvolution may be benefited by it.

℞.

*Olei Sabinæ* ʒj.

*Mucilag. Acaciæ* ℥ij.

*Tinct. Senegæ* ʒiss.

*Syrupi Simpl.* ℥j.

*Aquæ Camph. ad* ℥vj. *misce.*

***Fiat mistura, cujus sumat cochleare medium unum ter in die post cibos.***

**Saccharum**—Sugar as a food possesses well-known properties; it is a nutrient to the adipose tissue of the body and a respiratory fuel. It is used in Pharmacy for a variety of purposes, but the physician rarely orders it except to sweeten mixtures or to assist by its density in the suspension of powders. The Pharmacopœia orders its addition to water to increase the solubility of lime, and to prevent changes in various unstable preparations.

**Saccharum Lactis** is used principally, owing to the hardness of its particles, to effect the minute subdivision of substances in powders or pills, and thereby increase their efficacy and insure their equal distribution in each dose.

Owing to its resisting fermentation, it is given to sweeten the foods of dyspeptic infants, instead of cane sugar; and for a similar reason it has been given in various irritable conditions of the stomach, and as a food in some wasting pulmonary diseases.

**Sambuci Flores**—The water distilled from fresh elder flowers cannot be said to possess any therapeutic action, though other parts of the tree are by no means inert, for the inner bark is cathartic and emetic.

The water is used as the fragrant basis of lotions, and enjoys the popular reputation of a cosmetic, clearing the facial skin of marks caused by exposure to sunlight. It is occasionally used (diluted) as a vehicle for internal remedies.

**Santonica, and Santoninum**—its active principle—are used to cause the destruction of worms in the intestinal canal. Santonin is by far the best vermicide for the common round worms—*(ascarides lumbricoides)*—acting speedily and certainly when properly administered. It also kills the thread-worm, though it appears to have no effect upon the tape-worm when given in safe doses.

It exercises its toxic effects on these parasites in doses which do not produce purgation, though it purges if given in large doses, and it may cause serious cerebral symptoms. Death has occasionally followed the use of the drug in very young children or infants, in whom it occasionally produces convulsions, vertigo, and coma, with purging and vomiting. There is some reason for supposing that the samples of the drug causing these symptoms have not been pure.

Santonin, like many other remedies of its class, produces its effects more certainly if administered after fasting, or after the operation of a mild purge. In castor-oil, as pointed out by Kuchenmeister, it acts more satisfactorily than when given in any other way, and the writer can strongly endorse the accuracy of this observation, after seeing its administration in some thousands of instances in the practice of a children's hospital. Unpleasant symptoms were never observed, though the drug was given in full doses; the oil appears to lessen very considerably the risk of any evil effects. To a child two years old 2 grs. may be given at bed-time, mixed up with a large teaspoonful of castor oil, and more oil or other purgative administered in the morning if necessary. The worm is generally expelled dead.

Some curious effects are constantly observed to follow the use of santonin. Yellow vision is one of these, and may be noticed shortly after the dose is given—inside an hour; every object appears yellow or green to the patient, and violet objects are recognised with difficulty, though the humours or solid tissues of the eye are not in any way coloured. The effects appear to depend upon the action of santonin on the delicate centres for vision. The retinal blood vessels are always congested. Perversions or alterations in the smell and taste of food are also occasionally experienced by the patient. The urine is very often stained yellow, orange, or red, apparently varying in colour according to the degree of its alkalinity; and santonin acts as a diuretic, stimulating the kidneys, by which it is eliminated, and it also sometimes renders the bladder irritable. It is supposed to act in the blood in combination with soda. Santonin has been recommended and tried in nocturnal incontinence of urine in children, and in amaurosis, and has been suggested as a remedy for colour-blindness; but its utility in these cases is doubtful.

The result of Brown and Ogston's experiments prove that when given to *young* animals santonin produces cataract.

Santonin may be given in the form of lozenge or as a powder, with a little calomel, to those who cannot bear the taste of castor oil; or it may be given in a suppository.

(*For an Adult.*)

℞.

*Santonini gr.*vj.
*Olei Theobromæ gr.* x.
*Cetacei gr.*ij. *misce.*

*Fiat suppositorium nocte utendum.*

(*For a Child two years old.*)

℞.

*Santonini gr.*ij.
*Sacchar. Alb. gr.*ij. *misce.*

*Fiat pulvis mitte tales* iv., *st. unum omni nocte ex coch.* i. *min. ol. ricini.*

**Sapo Animalis, Durus, and Mollis**—These substances are introduced into the Pharmacopœia not on account of any supposed therapeutic properties which they possess, but with the intention of assisting, by their physical qualities, to hold different preparations together. Thus, curd or animal soap enters into several suppositories, whilst hard soap is the excipient for seven pill masses, and soft soap enters largely into the liniment of turpentine.

Soap, however, does possess virtues which make its use in medicine sometimes valuable. Thus it is an antacid, and, acting like the alkalies, will counteract an excess of acid in the system, and this, too, in a way which cannot so readily be achieved by the soluble alkalies. It can be so easily given in the pilular form that we can manage to have its alkaline effect produced at that part of the canal which the more soluble alkalies generally do not reach. It probably acts as a restorative by supplying to the bile some salts which are natural constituents of that fluid. At the same time it may assist in the emulsifying process going on in the duodenum.

It has been long since pointed out by Paris that soap, added to purgatives like aloes and jalap, mitigates their acrimony, and at the same time quickens their operation; and this is frequently explained by pointing out the *solvent* power of soap over these bodies. Large doses of soap have been highly recommended as a solvent for gall-stones, and as a means of rendering the urine alkaline in cases of renal calculi, in both of which instances its use should be pushed.

It acts as a laxative when swallowed or introduced into the rectum, and this latter action of soap affords one of the most simple and convenient methods of emptying the lower bowel. In the case of infants, a thin, wedge-shaped piece of ordinary brown or white soap may be introduced through the anus for an inch or more, and held there for a few moments. By its irritation, reflex action is aroused, causing the contraction of the rectum and often of the entire colon. In the case of adults a small plug as large as the last joint of the index finger may be wholly inserted like a suppository, and allowed to remain till expelled. This may be often found very serviceable in the reflex constipation of painful hæmorrhoids, when ulceration is not present.

Externally, the cleansing properties of soap are well known; and it should be remembered that it often irritates eczema and prevents its cure, while sometimes in sluggish cases it may act as a healthy stimulant. By far the least irritating soap made is Pears's transparent preparation.

The official liniment of soap is a valuable remedy in sprains, bruises, and stiffness of joints from inflammatory effusion; its action in such cases is called "discutient." It removes the swelling by stimulating the absorbents, and requires friction in its application. The plaster is supposed to act in the same way, but it probably possesses no specific action beyond the support and pressure which it affords, at the same time giving the affected surface somewhat of the benefits of an internal part.

**Sarsæ Radix**—About this drug very different opinions prevail, some authorities condemning it as absolutely inert, while many surgeons firmly believe in its virtues as a diuretic, diaphoretic, and anti-syphilitic. It is highly probable that the *fresh* root possesses properties which render it of great value in the treatment of secondary and tertiary syphilitic affections, various skin diseases, &c.

The writer has satisfied himself, from carefully watching the drug, that it produces no appreciable therapeutic effects. The compound decoction occasionally gives results worth its cost; but there are three ingredients contained in it which possess well recognised tonic and diaphoretic properties. Both the simple and compound decoction make elegant bases for more active medicines, as perchloride of mercury and iodide of potassium.

**Sassafras Radix** is generally classed as a stimulant and diaphoretic; the oil does produce the effects of a mild stimulant, acting upon the vascular and nervous systems.

The drug is often employed for its flavour, and it gives diaphoretic qualities to the compound decoction of sarsaparilla.

**Scammonium** and its resin resemble jalap very closely in their action. They are powerful hydragogue purgatives, producing their effects probably by their *local* irritative action on the bowel. Scammony causes, in about four hours, the evacuation of the contents of the colon in a semi-solid form, soon followed, with much griping, by liquid stools. Five grains of the resin, or ten of the scammony or gum-resin, are a fair dose for an adult; but this drug should be given in combination with some purgative which would assist its action and diminish the griping. The best way to achieve this object is to combine it with calomel, in which case the dose may be diminished, and the local irritation in the bowel prevented.

Sulphate of Potash is said to correct the action of Scammony. Its use is indicated where the thorough evacuation of the contents of the bowel is desired—as, for example, in the case of impaction of fæces, or where a quantity of serous fluid is required to be promptly removed from the blood, as in head injuries and dropsies.

It appears to act more promptly when given with an alkali, and soap answers this purpose well.

Though a powerful stimulant to the intestinal glands, recent experiments do not show that scammony has any but a very feeble effect upon the liver.

It is a favourite remedy in the constipation of children.

Scammony has been much used as a remedy for the various forms of parasites infesting the alimentary canal, especially of children. There is, however, no evidence to show that it acts as a true Anthelmintic, since its beneficial results in such cases appear to be easily explained by its irritant purgative qualities.

*(For an Adult.)*

℞.

*Scammoniæ Resinæ gr.*x.
*Hydrarg. Subchloridi gr.*vj. *misce*

*Et divide in pulv.* ii. *st.* i. *statim.*

**Scilla**—Squill is a violent irritant poison, causing death by its action upon the gastro-intestinal mucous membrane, giving rise to vomiting and purging and severe inflammation of the mucous tract. These effects are noticed in a more or less marked degree, whether the drug be swallowed, applied to the broken skin, injected into a vein or into a serous cavity, or under the skin. It is excreted by three outlets—by the bowel, acting as a mild purgative; by the kidneys, which it stimulates, producing diuretic effects; and by the pulmonary mucous membrane, whose secretion it increases, thus affording us an excellent stimulating expectorant. It is for this last effect that squill is ordered most frequently, and it may be well combined with hippo. The elegant official syrup, and the oxymel, in dram doses, possess reliable expectorant powers; and are favourite remedies in the bronchial affections of childhood and infancy, in 5 minim doses. It is rarely used alone as a diuretic, but is generally given with digitalis or mercury. (See Digitalis.)

Its use is indicated in catarrhal affections and dropsies in the absence of any inflammatory state of the stomach, bowel, or kidneys. It is especially useful in cardiac dropsy.

*(As a Diuretic.)*

℞.

*Aceti Scillæ* ʒiij.
*Tinct. Digitalis* ʒj.
*Decoct. Scoparii* ℥viiss. *misce.*

*Fiat mist. cpt* ℥i. *ter in die.*

*(As an Expectorant.)*

℞.

*Pulv. Scillæ gr.*ij.
*Pulv. Ipecac. gr.*ij.
*Morphiæ Mur. gr.*$\frac{1}{10}$. *misce.*

*Fiat pil. mitte tales* xii., *st.* i. *sexta q. q. hora.*

*(As an Emetic for a child one year old.)*

℞.

*Syrupi Scillæ.*

*Vini Ipecac. ana* ℥j. *misce.*

*St.* ʒi. *omni hora ad effectum.*

**Scoparii Cacumina**—Broom is a valuable diuretic of the stimulating class, and resembles buchu and pareira. In large doses it is an irritant to the gastro-intestinal mucous membrane, producing vomiting and purging, though only to a slight degree, and it may be said to be the safest and most reliable diuretic. It possesses in medicinal doses a slight laxative action, and is especially useful in cases of dropsy. As it stimulates the kidneys directly during its elimination, it should be used cautiously in inflammatory or congested conditions of these organs. Broom decoction may be elegantly combined with digitalis or cream of tartar.

The following formula from Neligan will give one of the best of diuretic mixtures:—

℞.

*Succi Scoparii* ℥*ss.*

*Acetatis Potassæ gr.*lxxx.

*Spirit. Juniperi* ʒij.

*Aceti Scillæ* ℥*ss.*

*Decocti Scoparii ad* ℥viij. *misce*

*Et sumat cochlearia duo ampla quartis horis.*

Or,

℞.

*Succi Scoparii ad* ℥iv.

*Tinct. Digitalis* ʒiv.

*Spt. Æther. Nitrosi* ʒvj. *misce.*

*Fiat mistura, cujus capiat* ʒi. *sextis horis.*

**Senegæ Radix** is one of the most frequently used expectorants. It is credited with several virtues, but is seldom given with any other intention than that of acting upon the bronchial mucous membrane, over which it exercises a stimulating influence. Senega is given in chronic bronchitis and emphysema when there is profuse adhesive discharge; there is difficulty in demonstrating how it acts, though its good is universally acknowledged in the last stages of bronchitis, especially in the aged and weak. Some authorities explain its effects as depending upon a stimulating or irritating action on the respiratory centre, which causes continuous coughing, thus keeping the tubes clear and preventing the accumulation of mucus. Farquharson believes it may act by a tonic influence over the muscular tissue in the bronchial tubes, thereby facilitating the expulsion of their contents. Its power as an expectorant is greatly increased by combining carbonate of ammonia with it.

It causes a warm acrid sensation when chewed, and increases the salivary secretion; in large doses it is emetic, and may cause purging. It does not increase the amount of urine in health, but augments it in diseased conditions of the kidneys or heart, or when there are accumulations of fluid in any of the pleural cavities.

The tincture of senega possesses the extraordinary quality of emulsifying fats and oils in quantities so small that its medicinal action may be left out of consideration; thus 5 minims will emulsify half an ounce of fixed oil. This pharmaceutical property may find some application in therapeutics, as the tincture administered after meals may assist the emulsification of the fats before they leave the stomach, and thereby probably hasten their absorption by the lacteal vessels of the villi in the small intestine. The writer has administered tincture of senega in several instances of wasting from pulmonary disease, and though he has not had sufficient evidence of the value of the drug, when given with the intention of increasing the weight of the body, he believes it will prove useful.

The following is one of the most popular combinations for chronic bronchitis:—

℞.

*Infus. Senegæ ad* ℥viij.
*Tinct. Senegæ* ℥*ss.*
*Tinct. Camph. Co.* ℥*ss.*
*Ammon. Carb.* ʒ*iss. misce.*

***Fiat mistura, capiat cochleare magnum quartis horis.***

**Senna** is a valuable cathartic. Speedily entering the blood, it produces its effects upon the bowel, and it has been proved to act in the same manner whether administered by the mouth or injected into a vein. The small intestines are stimulated by it, and both their secretion and movements are increased; it produces thin but not watery motions, generally accompanied by considerable griping pain. Senna when administered to nursing mothers appears in the milk, where, according to Dolan, "its peculiar flavour and odour are distinctly perceptible, though it does not lessen or increase the secretion of milk." It invariably gripes the infant.

Senna should be combined with aromatics to correct the griping, and the infusion is a valuable vehicle for administering the sulphate of magnesia.

It is a safe purgative for children; though causing pain, ill effects are rarely seen to follow large doses.

In dyspepsia and obstinate constipation the infusion in a wine-glassful dose, to which a tablespoonful of the tincture is added, makes a powerful purgative. It acts, according to the experiments of Rutherford, slightly as a stimulant to the liver.

The syrup is an elegant, though very uncertain purgative for young children, and it may be used as the vehicle for almost any medicine ordered as a powder. 2 grs. of grey powder given in a teaspoonful of syrup of senna is a very palatable purgative and cholagogue.

The confection is a mild and safe laxative, suitable in most cases of chronic constipation when given in teaspoonful doses.

**Serpentariæ Radix**—Snake-root is a stimulating tonic, possessing feeble aromatic properties. It acts like the members of the same class in the manner already described.

Small doses increase the appetite and promote digestion by mildly *stimulating* the mucous membrane of the stomach to pour out increased secretion. Large doses exaggerate this effect, and produce *irritation* in the stomach and bowel, as evidenced by nausea, diarrhœa, reflex headache, &c.

It is employed in dyspepsia arising from want of tone or atrophy of the gastric tubules, and its supposed stimulating properties have obtained for it some repute in low febrile conditions, as in typhus, typhoid, and diphtheria.

Snake-root does not, as once believed, possess any value in the treatment of rabies or snake-bites, nor is there any evidence of its emmenagogue or diuretic properties.

This drug is seldom employed; it appears to lose its properties by keeping, and many samples which have been long in the possession of the pharmacist seem to be inert.

In fevers it can be well administered in the following form:—

℞.

*Tr. Serpentariæ* ℥j.
*Infus. Ejusdem* ℥ix.
*Ammon. Carbonatis* ʒj. *misce.*

*Cpt. cochleare unum magnum tertiis horis.*

**Sevum Præparatum**—Suet is a well-known fat and a nutritious article of diet, but it is introduced into the Pharmacopœia solely for its physical qualities, finding a place in blistering plaster and mercurial ointment.

**Sinapis**—Mustard is rarely prescribed internally, except as an emetic in cases of poisoning, when a teaspoonful stirred up in a tumblerful of warm water may be administered, and warm water freely swallowed afterwards. It is largely used as a condiment, and is supposed to increase the appetite, though it is almost certain that the gastric juice is not markedly increased by its local action.

Externally, mustard is the best counter-irritant for general purposes; it differs from cantharides in the rapidity and amount of pain attending its action. When applied to the skin, mustard quickly causes a flow of blood to the vessels of the part, and if its application be continued too long, inflammation of the skin, vesication and painful sloughing, or ulceration, may follow. As mustard is a very frequently applied remedy, and often required on a moment's notice, the student should be able to rapidly make a sinapism.

The plaster is spread on a variety of fabrics, and covered with tissue paper, muslin, cambric, &c., but every requirement is met by the following rapid, cheap, and convenient plan:—

The required quantity of mustard is put into a large cup, (about a tablespoonful of mustard makes a fair-sized sinapism), and as much *cold* water is poured upon it as will make a soft uniform cream, not quite so fluid as to flow or pour readily out. A sheet of paper is procured of such a thickness as will readily permit the fluid part of the cream to soak through it, without becoming too easily torn. Old newspaper is by far the best texture for this purpose, and it should be laid flat upon a table or smooth surface, the mustard cream turned out of the cup, and roughly smeared or spread over its centre. The circumferential or clean parts of the paper are folded over this, making the required shape and size of the sinapism, which is lifted off the table, and the surface which was undermost applied direct to the patient's skin. Less than a minute is enough (when the materials are at hand) to perform this little operation. If not made in the sick room it should be carried there on a dinner-plate.

It will be observed that the mustard does not thus come in contact with the skin, but only its moisture which soaks through, the paper being between the skin and the cream. The sinapism should be kept in contact with the patient's body by a bandage or pad of flannel for 15 to 30 minutes. In the case of children the mustard, before being moistened, should be mixed with from 1 to 4 parts of wheaten or corn flour to dilute it. Often the question is asked the young practitioner, how long should such an application be permitted to remain? This is difficult to answer, and he should direct that, after a few minutes the edge of the sinapism be raised and the redness of the skin noticed. If it remain scarlet for a few minutes the application should be removed, but if the redness is only temporary the sinapism should be kept on longer.

A great mistake is made in directing the surface to be immediately covered with cotton-wool, greased linen, &c.; it should first be always wiped dry and clean with a very soft rag; otherwise as much acrid moisture may be left on it as may produce vesication and dangerous ulceration in the delicate skin of an infant.

The mustard bath is a favourite method of applying counter-irritation—to the feet for head-ache; to the abdomen for amenorrhœa, at the time of the expected period; or to the loins in suppression of urine. About two ounces of powdered mustard seeds to ten gallons of hot water (102°) will make an agreeable bath.

Pain of various kinds is relieved by the application of a sinapism; but, as a rule, it is aggravated if it be placed directly over the pained nerve. It should, as a general rule, be applied over the site of its origin near the spine.

The action of mustard when placed over the seat of internal inflammations, or over the chest and legs in cases of stupor, is to be explained on the theory of reflex action. There is no difficulty in seeing that the impression produced by an irritant on the peripheral endings of any nerve may be conducted to the nerve centre or brain, and from thence may be reflected to any other part of the nervous system; thus a sinapism on the chest may stimulate the respiratory or cardiac centres. (See under Cantharis.)

**Soda**—The salts of soda possess such close resemblance in their pharmaceutical, chemical, and therapeutical properties to those of potash, that only a brief enumeration of them is necessary. Speaking generally, soda salts differ in the following respects from the corresponding potash compounds—(1) they are less caustic when used externally; (2) they do not exert the same depressing influence over the heart, and hence are not poisonous in the sense that potash salts are; (3) they are less diuretic, and (4) they form less soluble salts with uric acid.

**Soda Caustica** is seldom employed; it is identical in its action with caustic potash, but is much weaker. Mixed with an equal weight of recently burned lime, and made into a paste with alcohol, it is known as London Paste, and is used as a caustic application to the tonsils. (See Potassa Caustica.)

☞ *Antidote.*—Weak acids and oil, as for Caustic Potash.

**Liquor Sodæ** resembles the liquor potassæ, but is seldom used. It possesses little if any effect upon the kidneys or bladder, though it will render the urine alkaline after a time.

**Soda Tartarata**—Rochelle salt closely resembles the tartrate of potash, though its diuretic powers, in half to one ounce doses, are so feeble that they are doubted by some. It is a very popular saline purgative, acting as a strong stimulant to the intestinal glands. Small doses have the power of rendering the urine alkaline like the potash salt, though not so certainly.

Its cathartic action is most unreliable unless given in a full dose, so that it is a good rule to give at least six drams. Often four drams will be administered and *no effect whatever* be noticed, while five or six drams may purge freely. It should be given always in a large quantity of water when its cathartic effects are desirable.

One ounce of Rochelle salt dissolved in a bottle of ærated lemonade or ginger ale makes a most elegant and pleasant saline purgative. Some authorities believe that this salt, like the sulphate of magnesia, purges by *retaining* the watery fluids always present in the intestinal tube, without causing any stimulation of the glands. Rutherford's experiments do not support this, and they prove Rochelle salt to be a mild hepatic stimulant. This salt also enters into the composition of a Seidlitz powder, which consists of

Rochelle Salt, 2 drams;
Bicarbonate of Soda, 40 grains;

mixed and folded in a *blue* paper; to be taken in effervescence with

Tartaric Acid, 35 to 40 grains;

which latter is generally folded in a *white* paper.

**Sodæ Acetas** resembles the acetate of potash, and may be taken in the same doses. In its action it is the most markedly diuretic of all the soda salts.

**Sodæ Arsenias**—(See Arsenic)—It contains so little soda in each dose that this may be entirely overlooked; and the salt should be regarded as an arsenical preparation; 5 to 10 minims of the liquor may be given in infusion of calumba, when the use of arsenic is indicated.

**Sodæ Biboras** is described under Borax.

**Sodæ Bicarbonas** closely resembles the bicarbonate of potash (which see). Like it, it is antacid, and though less irritating, it possesses greater saturating power. It has also a more soothing effect upon the stomach than the corresponding potash salt, but is very inferior to it as an antilithic, since the salts which it forms with uric acid are only slightly soluble. This is seen in gout in the deposit which forms about the joints, which consists of urate of soda. It does harm in cases where there are phosphatic sediments in the urine.

In the form of Vichy water the bicarbonate of soda has been long in use as a remedy for many complaints supposed to be of gouty origin. The official effervescing solution when administered with milk is sometimes the only food retained by an irritable stomach.

Externally, the bicarbonate of soda, as recently pointed out, possesses an almost magical power when applied to painful burns and scalds. If used *immediately* after contact with great heat, what would otherwise be a painfully blistered spot is entirely relieved, and often in a few hours may be found to differ in no way from the healthy surrounding skin. It may be applied, in solution, of any strength, and the salt made into a paste with water and rapidly applied to the injured part generally produces surprising results, if vesication has not already occurred.

It is used in a variety of cutaneous affections, and a large tablespoonful to a pint of water, sponged over the itching skin in urticaria and other complaints, often gives relief; it may be combined in these cases with prussic acid. It relieves the pain of wasp stings, but is inferior to ammonia in this respect.

**Sodæ Carbonas** resembles the bicarbonate, but is more caustic, and more soluble. It makes a very good effervescing mixture when given with lemon juice, superior, indeed, in its sedative effect upon the stomach to any other combination; and with it hydrocyanic acid can be given. The dried carbonate of soda is the most convenient antacid to give in pill or powder; it is nearly three times stronger than the crystallised salt.

℞.

*Sodæ Carbonatis* ʒvj.
*Acid. Hydrocyanici Dil.* ♏ xxx.
*Aquæ Destillatæ* ℥x. *misce.*

*Fiat mistura, cujus cpt.* ℥i. *cum* ℥*ss succi limonis recentis tertiis horis.*

The alkaline bath is made by dissolving 8 oz. of carbonate of soda in a large bathful of water—say about 80 gallons.

**Sodæ Chloratæ Liquor**—The hypochlorite of soda contained in this liquid is readily decomposed when it comes in contact with the weak acid compounds of the body.

The hypochlorous acid, which is given off in contact with any acid, is a powerful oxidising agent, giving off its active oxygen, which greedily attacks most animal substances, whilst its chlorine enters into combination with the hydrogen of many bodies. This solution is probably a strong disinfectant —that is, it has power to destroy the germ or contagion of disease, and so render it incapable of communication from a patient to a healthy individual. It is antiseptic because it destroys septic organisms, and thus arrests decomposition. In addition to these properties, this drug is regarded as a stimulant. These varied qualities render it of use in low typhoid conditions and adynamic fevers, especially in diphtheria and malignant scarlatina. It will *probably* be useful in acute yellow atrophy of the liver, decomposing leucin and tyrosin.

It should be given alone with water; one scruple mixed with 1 oz. every two or four hours.

Externally, it is an invaluable remedy *wherever fetor is observable,* as a gargle in putrid throat affections, or as a lotion to foul sores; in all of which cases it may be made of the same strength as if for internal use. (See Chlorine and Calx Chlorata.)

**Sodæ Citro-tartras Effervescens**—This agreeable antacid and purgative is the official representative of the popular "Granular Citrate of Magnesia," only the latter usually contains some Epsom salt. It may be taken in tablespoonful doses, dissolved in a large quantity of water, as it seldom affects the bowel unless freely diluted.

**Sodæ Hypophosphis** resembles in its action the lime salt of the same name (which see). It has been supposed to give all the benefits of free phosphorus without any of its draw-backs; but the evidence of its usefulness in scrofula and phthisis is regarded by several authorities as somewhat doubtful.

**Sodæ Nitras** is only used to prepare arseniate of soda or nitric acid.

**Sodæ Phosphas**—Though this salt has been extolled as a substitute for phosphorus, it is doubtful if it has the slightest action of the kind. It is a most valuable saline purgative, and can be safely used where nearly every purgative is contra-indicated—in serious cases of enteric fever with bowel complication. It can, owing to its freedom from unpleasant taste, be given instead of common salt, in beef tea and soup. This is a most satisfactory plan of giving a mild cathartic in fevers; half an ounce often will be found enough, but three times this quantity may be administered. It is also recommended in small doses for the qualities which it possesses, in common with all the soda and potash salts—antacid, diuretic, antilithic, &c.

**Sodæ Sulphas**—Glauber salt is not much used now except in veterinary practice, though, by its stimulating effect upon the glandular intestinal apparatus, it is a safe and certain purgative. The experiments of Rutherford also prove that it is a moderately powerful stimulant to the liver.

**Sodæ Valerianas**—Used only to prepare the valerianate of zinc.

**Sodii Chloridum** enters so largely into every tissue of the body that life cannot be sustained when it is withheld. It is absolutely necessary wherever cell growth is rapidly going on; animals would soon die without it (especially growing animals). Small doses are restorative and tonic; larger doses (1 to 2 ozs.) are either slightly purgative or emetic.

*Chloride of sodium* possesses expectorant qualities if given in dram doses—every 2 or 4 hours—and small quantities act as ciliary excitants by reflex action when slowly sucked in the mouth. It is excreted by the mucous membranes of the body. It is a certain antiseptic, and destroys the small thread worm, *ascaris vermicularis.* When swallowed or administered by the rectum, 1 oz. may be dissolved in 3 or 4 of water.

One pound of salt and three gallons of water make a convenient substitute for sea-water.

It is used sometimes in about the same proportions (1 to 30) as a gargle in chronic throat ulcerations, and is a valuable antidote in cases of poisoning with nitrate of silver, or after swallowing a leech.

**Spiritus Ætheris Nitrosi**—The action of this drug is described under Æther Nitrous.

**Spiritus Rectificatus**—Though rectified spirit is really introduced into the Pharmacopœia for its solvent action upon gums, resinous substances, and oils, nevertheless the student is expected to know something of its therapeutic power.

The popular term of "Stimulants," as applied to the various preparations containing alcohol, is very apt to mislead. If alcohol be regarded as a true narcotic, like chloroform, ether, or, in some respects, opium, much of the difficulty of comprehending its action will disappear. Narcotics at first cause a period of stimulation or excitement, afterwards followed by sleep and coma; and alcohol differs from the substances just mentioned only in degree, its period of excitement happening to be more prolonged. The true appreciation of this fact will render its use as a remedial agent in many cases more easily appreciated.

Small doses augment the force of the heart, dilate the capillaries of the skin, and increase the mental activity—probably by dilating the cerebral vessels; while, unfortunately, the effects of large doses are too well known to need any description. Poisonous doses produce profound coma, dilated pupils, pallor of the skin, feeble pulse, a reduced temperature, embarrassed respiration, and, finally, death from paralysis of the respiratory or cardiac centres.

Much difference of opinion exists about the action of alcohol upon the temperature; there can, however, be no doubt that poisonous doses reduce it from 1° to 3° or even 4°, and often small doses cause it to fall half a degree; these effects are, however, not constant, and are not met with in those having become accustomed to its prolonged or intemperate use. The next difficulty is about its elimination, and it is equally certain that a fair quantity (it is not clear how much) disappears in the system.

Alcohol is given very freely by many in fevers, and in acute disease; and elaborate directions are given for its exhibition in such cases, some authorities relying upon signs of failure in the heart and general circulation, others looking for indications from the exhausted nervous system. Much more information is needed before any definite conclusions can be arrived at. Most authorities, however, would probably agree (1) that alcohol is not necessary at all in the *majority* of cases; (2) that often the most unpromising cases pull through without it; (3) that in severe cases it cannot be safely withheld from those habituated to it; and (4) that it is rarely, if ever, needed in the very large doses prescribed by some—6 to 10 oz. whiskey may be regarded as representing a liberal daily allowance.

There is, however, another aspect of the case about which most will agree, and that is the good effects of one large dose of alcohol at bed-time as a narcotic in very many diseases. This produces effects which can hardly be expected from any other narcotic if the patient has been a stranger to the drug. In sleeplessness from overwork, neuralgia, &c., its good effects are apparent; and, moreover, there is little fear of the patient becoming the victim of intemperance, when given in one large dose, like a draught of laudanum or chloral, after his retiring to bed. It should be given made in punch; and whiskey is the best form of alcohol for this purpose. In many inflammatory diseases the addition of 30 grs. of nitre is an improvement. The student should remember that in ordering wines and spirits the effects are not always in proportion to the per centage of alcohol contained in them, since the subtle ethers, which develop as the liquid ages, produce characteristic effects.

Brandy, Whiskey, Gin, and Rum contain about 50 to 54 per cent. of alcohol by measure.

The following liquids contain the following percentages of alcohol by weight:—

| | |
|---|---|
| PORT WINE, ... | 16 to 17. |
| SHERRY WINE, ... | 15 to 16. |
| MADEIRA WINE, ... | 14 to 15. |
| CLARET, ... ... | 5 to 7. |
| PORTER (bottled),... | 5 to 6. |
| ALE (bottled), ... | 5 to 6. |

☞ *Antidote.*—After the use of the stomach-pump, cold affusion, and large sinapisms to the surface of the body, strong hot coffee, with a little sal volatile, should be injected; and galvanism may be resorted to. The writer has seen at least four cases where an apparent recovery was made, after profound coma, and death suddenly and unexpectedly supervened; the heart in all cases being filled with a fibrinous clot, which could hardly possibly be otherwise than *ante-mortem.* In three, signs of pneumonia after death were observed.

Externally, spirit is highly esteemed by surgeons as a dressing, and by them is used in two very different ways. The ordinary "spirit lotion" is made by adding 1 part of the official Spt. Vini Rect. to 3 of water, or equal parts of whiskey and water, and so constituted may be used as an evaporating lotion, when applied to any part on lint, and the vapour permitted to escape freely. It thus cools the part, and by directly abstracting heat it modifies inflammatory action. When spirit lotion is applied on lint, and covered in with oiled silk, so that its vapour cannot escape, then it acts like a mild, stimulating poultice, possessing antiseptic properties.

**Stramonii Folia and Semina**—These drugs belong to a natural group called from their action (by Headland) deliriants. The group contains Belladonna, Hyoscyamus, Stramonium, and Datura Tatula. Stramonium appears to very closely resemble in its action Belladonna (which see).

It is largely used to relieve spasm in asthma, either swallowed (when it is uncertain) or smoked in a pipe, or as a cigarette; or simply the smoke of the burned herb inhaled through the nose. All the plants mentioned above yield alkaloids, which are practically identical.

The antispasmodic effects of stramonium are better marked than those belonging to the other members of the group.

☞ *Antidote.*—Same as for Belladonna—Opium, or Morphia hypodermically.

**Strychnia**—The action of this alkaloid is described under Nux Vomica, from which it is obtained.

**Styrax Præparatus**—This balsam resembles those of Peru and Tolu in its action, being a feeble, stimulating expectorant. It possesses some tonic influence over the genito-urinary mucous membrane, and has been used with some success in gonorrhœa. 20 grs. may be given, made into a bolus with powdered sugar or liquorice.

**Sulphur**—Sublimed sulphur, when administered in a full dose (say 2 drams), passes unaltered through the stomach, and meeting the alkaline bile, a small quantity is absorbed after its solution in this fluid. This quantity, after circulating through the blood, is excreted by the skin in the form of sulphuretted hydrogen, staining any metallic substances with which it comes in contact. Some of it is also excreted by the kidneys, as sulphates, and some passes off by the respiratory mucous membrane, which it stimulates. Of the surplus in the intestine a small quantity is converted into sulphides by the bile, and, acts as a mild irritant (just as sulphide of calcium would do, if administered); this causes slight purgation, producing large, softened motions. The residue, which constitutes the greater part of the dose, acts, by the angularity of its gritty particles, the part of an irritant, like bran, &c., and increases the peristaltic movements of the bowel, and thus aids purgation. This seems to be the most probable explanation of the internal action of sulphur in full doses. Since it exists in large quantities in the bile, sulphur will act as a restorative in some conditions of the system characterised by a deficiency of that fluid.

Its purgative action renders it very useful in the treatment of hæmorrhoids, and Neligan believes that in addition to its effect as a cathartic in this complaint, that it exercises a beneficial soothing influence over the hæmorrhoidal vessels, whereby their calibre is diminished and the symptoms ameliorated.

It has been used as a purgative in skin diseases, but often aggravates matters, if there is active cutaneous inflammation going on.

Sulphur is an expectorant, probably, stimulating as it passes out, the mucous epithelial cells of the respiratory passages, with their cilia.

All the virtues of sulphur are found in a vegetable containing it in considerable quantity (the onion), and it will be found for every purpose the most satisfactory form for the administration of the drug. The Spanish onion, boiled for one or two hours, and eaten freely at bed-time, is a certain purgative, and possesses most decided expectorant qualities. In cases of chronic catarrh of the larger respiratory tubes, this is more efficacious than any official expectorant. It would appear to act simply by stimulating the cilia, especially as the secretion is silently swept up to the larynx, without being increased perceptibly in amount. The effect of the Spanish onion is superior to that of sulphur on the bronchial mucous membrane, probably since it contains a volatile principle in addition to the sulphur.

Sulphur has been praised as an external and internal remedy in chronic rheumatism, and forms the principal ingredient in the "Chelsea Pensioner."

The sulphides have been highly recommended in various suppurative skin affections—as boils and acne; the onion treatment has proved much more satisfactory in the writer's hands than sulphide of calcium, which is often uncertain and intolerable. Ringer gives $\frac{1}{10}$ grain of this latter drug every hour.

Externally, sulphur is the best known treatment for the itch; a thorough application of the official ointment to the skin, after a hot bath and good scrubbing with soap to break up the furrows of the insect, generally proves efficacious. The pentasulphide of calcium, prepared by boiling one ounce of powdered sulphur with about an equal quantity of mortar, 'me-putty, or slaked lime, in half a gallon of water, is a more certain and elegant application. It should be lightly brushed or sponged over the affected part. It appears to act by instantly giving off sulphuretted hydrogen on coming in contact with organic matter, this gas destroying the insect. It is free from the objectionable greasiness of the ointment, and is less irritating, since no previous scrubbing or soaping is necessary.

The ointment is recommended in acne, and often does good when well rubbed into the indurated spots. The precipitated sulphur in a lotion is an unobjectionable way to use this remedy for acne.

℞.

*Sulphur. Precipitat.* ʒij.
*Glycerini* ℥j.
*Aquæ Rosæ ad* ℥viij. *misce.*

*Fiat lotio. Applic. mane nocteque.*

**Potassa Sulphurata** acts like sulphur when given in very small doses, stimulating the skin and intestines, and it is eliminated in the same way. It is a local irritant, and in large doses acts like an irritant poison, and produces narcotic symptoms and convulsions.

Externally, it is used as a bath (5 oz. to a large bath of warm water) in scabies; or the official ointment may be employed.

Its internal use is also advocated in various chronic skin affections in 3 gr. doses, in a pill. It will cure itch, like sulphur, when given internally, if its use is persisted in.

**Sulphuris Iodidum**—This remedy possesses some of the properties of the two substances entering into its name. It is principally used externally as a remedy in parasitic diseases, and occasionally in acne and scrofulous affections. From experience of its use in an agricultural district where *herpes circinatus* was exceedingly common (being transmitted to the human species from the cow), this remedy was found more certain than any other. It is, however, liable to produce irritation of the skin, but this greatly depends upon the method of its preparation; the official ointment requires great care and laborious trituration, otherwise the hard, gritty iodide is left in little masses, which produce local inflammations of the skin when applied.

**Sumbul**—This root is supposed to possess nervine tonic properties closely resembling valerian and musk, and has been used as a substitute for this latter drug in low typhoid states and fevers, asthma, delirium tremens, and epilepsy.

**Tabaci Folia**—Owing to its uncertain action in small doses, and its deadly power in large doses, tobacco is very seldom employed in medicine. When smoked, the leaf is one of the most valuable sedatives in the whole range of remedies for the restlessness of an over-worked and worried brain; but there can be little doubt that the mass of smokers become the slaves of habit, and in them very little, if any, therapeutic result is observed. Occasionally atrophy of the optic nerve follows prolonged and excessive smoking.

Tobacco is a local irritant; when used as snuff it is a good errhine, increasing the nasal mucus. Chewed in the mouth, or smoked, it acts first as a stimulant to the nerve endings in the salivary glands (Brunton), increasing the amount of saliva. If its use be continued, or the dose increased, this effect gives way to paralysis of these nerves, and dryness of the mouth results. On reaching the stomach, tobacco exercises the function of an emetic; this result follows its use also by the rectum. Finding its way into the blood, tobacco produces, in large doses, contraction of the pupil, collapse, great muscular prostration, coldness of the skin, diuresis, vomiting and purging, diminution in the force of the heart (which it appears to first tetanise and then paralyse), and, after producing general paralysis through its action on the nerves, it causes death by the respiratory muscles being paralysed. The brain is not disturbed in its functions, and the temperature falls.

Subcutaneous injection of nicotia causes death as rapidly as prussic acid, and the official enema might be followed by fatal results, if the entire quantity were given at once. Fatal effects have speedily followed the use of strong infusions applied to the skin to relieve pain or cure parasitic diseases; and too great caution can hardly be exercised in the administration of the drug.

Its paralysing effects have led to its successful use in the treatment of tetanus, strychnia poisoning, and asthma. Small doses, as the smoking of a pipeful, are believed to be diuretic and laxative to those unaccustomed to its influence. Its use in surgery in causing muscular relaxation is now given up for chloroform.

☞ *Antidotes*—Free stimulation after vomiting, or the use of the pump; the hypodermic injection of strychnia has been advocated; and artificial respiration should be persisted in.

**Tamarindus**—The pulp of the tamarind is seldom used alone; it is a laxative in doses of 1 to 2 oz., increasing the peristaltic movements of the intestines. It is said to be refrigerant, and is occasionally used in fevers in the form of "tamarind whey," made by mixing an ounce of the pulp in a little boiling water, and adding the infusion to a quart of milk. Its refrigerant action may be accounted for by the vegetable acids, malic, citric, &c., which it contains.

**Taraxaci Radix** has long enjoyed the reputation of a tonic, cholagogue, diuretic, and laxative. As it is now obtained from the chemist it has no such virtues. From the result of experiments with several samples of the extract the writer believes it to be the most inert vegetable preparation in the Pharmacopœia. The tonic effects of the *fresh* juice, prepared by the patient immediately before use, or even of an infusion prepared just after the root is gathered in spring (when the juice is bitter), are decidedly good, and it is a useful vehicle for more active tonics.

**Terebinthina Canadensis,** though possessing all the properties of the oil of turpentine, is only introduced into the Pharmacopœia for its physical properties. It is largely used in the preparation of microscopic objects, and has been occasionally given (made into a pill), with carbonate of magnesia, for gleet and chronic gonorrhœa.

**Terebinthinæ Oleum**—Turpentine is largely used as a counter-irritant; it possesses advantages over Cantharides in the speed with which it acts. The ordinary turpentine stupe is made by sprinkling the oil over flannel cloths wrung out of very hot water, and applying them quickly to the part. In this way rapid vesication can be produced. (For the rationale of its action, see under "Cantharis.")

Internally, turpentine acts as a general stimulant, and, in large doses, if it does not purge or pass off by the bowels, it causes inebriation like alcohol. It acts as an astringent by causing contraction of the smaller arteries and capillaries, and it has been supposed to have some coagulating effect on the albumen of the tissues. After circulating in the blood, it is eliminated by the skin, respiratory mucous membrane, and kidneys, acting as a diaphoretic, expectorant, and diuretic; and is useful in bronchitis and hepatic dropsy. It is apt to cause strangury and bloody urine, and should not be used where the kidneys are diseased. Turpentine also possesses very decided anthelmintic properties, but must be given in large doses (½ oz.), and its combination with castor oil renders it much less liable to cause strangury than if given alone. The tape-worm is dead on its expulsion, after the use of this remedy.

Turpentine is much used as a hæmostatic in pulmonary hæmorrhage; and by far the best method of administering it in this complaint is to surround the patient with the vapour, by pouring turpentine into vessels, in which a little hot water has been placed. Coming into direct contact with the bleeding point, the astringent qualities of the drug are exercised to best advantage. In the same way the enema is a valuable remedy in tympanitic distention of the abdomen; it excites such uniform contraction as expels all accumulations of imprisoned gas in the bowels.

The confection is an agreeable method of administering the drug, and has been found beneficial in iritis, in hysterical affections, and in the hæmorrhages of purpura, in which latter it is invaluable. Turpentine may be easily given in capsules or emulsion.

℞.

*Olei Terebinthinæ* ʒiv.

*Pulv. Gum. Acaciæ* ʒiiss.

*Syrupi Aurantii* ℥j.

*Mist. Amygdalæ ad* ℥viij. *misce.*

*Opt.* ℥i. *bis in die p. p. a.*

**Theobromæ Oleum** is introduced into the Pharmacopœia as a basis for suppositories. Parrish has shown that the addition of spermacetti helps the mass to speedily congeal, and thus renders it less liable to adhere to the moulds in which it is cast. More recently coccine is coming into use; it can be moulded by the fingers. (See page 46.)

**Theriaca** holds its official position owing to its excipient qualities, entering into five pill masses. In large doses it is laxative and nutrient.

**Thus Americanum** is not used internally. It is added to plasters on account of its mild stimulating influence on the skin, and also on account of its toughness and adhesiveness—very desirable qualities in a plaster.

**Tragacantha**—This gum is only employed to aid the suspension of heavy metallic powders in mixtures; it swells upon the addition of water into a thick mass or mucilage, which readily diffuses through any quantity of water to which it may be added. In the official mucilage of tragacanth it is doubtful if the gum can be correctly regarded as in a state of perfect solution. The paste, as before mentioned, is an excellent pill excipient. (See page 27.)

**Ulmi Cortex** is a feeble astringent and tonic; it formerly was used in chronic squamous and herpetic skin eruptions, but is seldom employed now.

**Uvæ Ursi Folia** is a good vegetable astringent and tonic; properties depending upon the amount of tannic acid which it contains. It is also feebly diuretic; and is highly recommended in chronic inflammatory conditions of the bladder, where there is much discharge. It has been used with advantage in menorrhagia, dysentery, and gleet.

**Uvæ**—Raisins are gentle laxatives; they are used principally for their flavour.

**Valerianæ Radix**—Valerian acts as a tonic and stimulant to the nervous system; and is especially useful in hysteria. There is much doubt about the manner in which it acts; and recent experiments, conducted in Germany, cannot be said to have thrown much light on the matter. Large doses increase the rapidity and force of the ventricular contractions, cause an increase in the cutaneous secretion, and produce hiccough, nausea, vertigo, and slight mental disturbance. The good it affects in disease appears to the writer *to be owing to its diminishing the irritability of the terminations of the sensory nerves throughout the body.*

It has been used with very doubtful success in chorea, epilepsy, whooping-cough, laryngismus, &c.

The salt of zinc with valerianic acid, in addition to its anti-hysterical properties, possesses weak anti-periodic qualities; and, combined with quinia and opium, is a most valuable remedy in the treatment of neuralgia, especially if there be a tendency to show signs of periodicity.

℞.

*Zinc. Valer. gr.*v.

*Quinæ. Sulph. gr.*v.

*Pulv. Opii gr.*iss. *misce.*

*Fiat pulv. Signa, "To be taken at bed-hour, in wafer paper."*

**Veratria, and Veratri Viridis Radix.** (See Sabadilla.)

**Vinum Aurantii, and Vinum Xericum** are introduced into the Pharmacopoeia for their solvent properties. The former to make quinia and citrate of iron wines, and the latter to form the menstruum for the remaining seven wines.

**Zincum,** and its salts. When used externally, these substances possess two properties—they are astringent and corrosive.

The astringent quality probably depends upon their forming insoluble albumen compounds, causing condensation of the tissue elements; at the same time producing contraction of the smaller vessels. The corrosive action depends upon their affinity for water, which they rapidly abstract from the tissues, thereby causing their death. This effect varies in intensity from the powerful action of the chloride and iodide, to the mild influence of the sulphate or oxide.

When administered internally, the zinc salts soon enter the blood, in which fluid they remain for a time, probably as albuminates, and are gradually and slowly eliminated in the fæces, and slightly by the kidneys. After a long course of zinc medication, symptoms of chronic poisoning may show themselves, not unlike what is seen in cases of lead poisoning.

*Acetate of Zinc*—This salt is used as a local astringent, and with some skilful practitioners is their favourite remedy in gonorrhœa; thus—

℞.

*Zinc. Acet. gr.*xxv.

*Tr. Lavand. Co. m.*xxv.

*Aq. ad* ℥x. *misce.*

***Fiat inject. secundis horis utenda.***

*Carbonate of Zinc* is used as a mild, unirritating astringent, or "drying" application to excoriations, intertrigo, &c. It resembles the oxide in its action upon eczema.

*Chloride of Zinc* is much used as a powerful caustic by surgeons for the destruction of lupoid, cancerous, and other growths. It is best applied mixed with about three parts of dry flour, and laid upon the diseased spot. Great care is necessary to prevent it spreading to the surrounding healthy parts; this is best accomplished by sprinkling them over with plaster of Paris.

The astringent qualities of the chloride have rendered it a valuable remedy in gonorrhœa, injected in the proportion of about 1 grain to the ounce, every two hours. It probably destroys the low organisms upon whose presence the disease may depend. It is a powerful antiseptic and deodorant. The liquor, diluted with 40 times its bulk of water, arrests putrefaction, and decomposes all gases with which it comes in contact. It may be used as a lotion to putrid ulcers, in the proportion of 3 minims to each ounce of distilled water.

*Oxide of Zinc* is chiefly used as a mild, soothing astringent in eczema. The zinc ointment is the best remedy for the troublesome eczema of childhood and infancy.

Internally, the oxide is found to enter the blood as lactate or chloride, and to exercise the functions of a mild astringent and sedative to the nervous system.

In the sweating of phthisis, the oxide has long enjoyed a high reputation, and may be used in the following form:—

℞.

*Zinci Oxidi gr.*iv.

*Ext. Belladonnæ gr.ss. misce.*

*Fiat pil. mitte tales* xvi. *st.* i. *ter in die.*

*Sulphate of Zinc* is the most popular local astringent, and is used as an injection

In GONORRHŒA, ℈i to 10 oz. water.

In LEUCORRHŒA, ℥ss to 1 pint.

In OTORRHŒA, ℈i to 1 pint.

In OPHTHALMIA, 1 gr. to 1 oz.

The dried salt is used as a caustic to uterine and other ulcers.

Internally, as a nervine sedative the sulphate has been found highly useful in chorea; given in doses, beginning with two grains, for a child of about seven, gradually increased to ten grains three times a day. The stomach in a very short time becomes markedly tolerant of large doses. Its use has been advocated in epilepsy, and other convulsive ailments, in bronchorrhœa, and diarrhœa, but with varying success.

In doses of 30 grains sulphate of zinc is the speediest and safest emetic. It acts, whether swallowed or injected into the circulation, and is especially useful in cases of poisoning.

For the *Valerianate of Zinc* see Valerian.

**Zingiberis Radix** is a powerful aromatic stimulant, acting like capsicum and cardamoms (which see); chewed, it is a valuable sialagogue; and used as snuff, it causes severe nasal irritation.

# GROUPS OF THERAPEUTIC AGENTS.

THERE are *two* well recognised and often mentioned effects of a remedy—the Physiological and the Therapeutical—and the student should be familiar with both these terms.

By the Physiological action of a medicine is generally meant the effects which the medicine will produce when administered to a patient in *health;* though it should be remembered that to produce these effects a perfectly healthy state is not *necessary*. Thus, if 10 or 20 grs. of quinia be administered to a perfectly healthy subject, the constitutional effect of the remedy soon shows itself in the characteristic group of symptoms called cinchonism. This is spoken of as the Physiological or Primary action of quinia. If a medicinal dose of this drug be administered to a patient ill with ague or neuralgia, it will be found to remove the disease; this is the Therapeutical or Secondary effect of the remedy. Suppose, however, the dose be a very large one; as in the first instance the remedy may produce cinchonism, even though the patient have ague or neuralgia, and in this case the effects would still be called Physiological. It will thus be understood that, in administering a remedy in disease, the physician often desires it to be given in such a quantity that the *Physiological* effects of the drug should be made evident, as in treating syphilis with mercury; chorea with arsenic; paralysis with strychnia; or pertussis with belladonna.

To discuss the different theories which have from time to time prevailed about the way in which medicines produce their effects in the system, is beyond the intention of a short work like this. Under the name of each drug, in the Therapeutical part of this book, will be found a short description of the way in which each is supposed to act. It will be hardly necessary to remind the student that the great bulk of remedies, after being swallowed, speedily find their way into the circulating fluid, accelerated or retarded by their crystalloid or colloid nature, and the well known laws of osmosis. By the blood they are carried to the different tissues or glands, upon which they produce their characteristic effects, and by which, in many instances, they are eliminated or thrown out of the body. Why they exercise their peculiar selective power over these particular tissues and organs, is a question which, with our present knowledge, we cannot attempt to explain.

For the sake of convenient reference, and with a view of grouping together many important remedies similar in their action, some of the most generally recognised groups or classes of medicines will be briefly noticed in alphabetical order:—

**Acids**—Though these are always regarded as a group of remedies belonging to a chemical classification, the recent additions to our knowledge of the effects of acid substances justify the mention of them as a group in a Therapeutical list. They are medicines, which, in the concentrated form, act mostly as caustics, and when given in medicinal doses, possess the power of *checking the acid secretions* of the body with which they come in contact; and at the same time they directly *increase alkaline secretions*. It is by this theory that Ringer explains their use in acid dyspepsia, sweating, &c. The principal members of the group are hydrochloric, acetic, nitric, sulphuric, phosphoric, nitro-hydrochloric, citric, and benzoic acids.

**Alkalies**—Under this head are included substances which have the power, when applied topically, of *checking alkaline* and stimulating or *increasing acid secretions*. The most important are caustic soda and potash, with their carbonates, bicarbonates, acetates, and citrates; ammonia and magnesia, with their preparations.

**Alteratives** are a class of remedies which, when administered, cure disease without producing any obvious impression on any of the organs of the body; and because the way in which they act is not understood, or capable of demonstration, in the present state of our knowledge, they are said to *alter* the morbid processes, and hence are called "Alteratives." The most important of this class are antimony, mercury, arsenic, iodine, and their preparations.

**Anaphrodisiacs** are medicines which weaken the sexual functions, as camphor, bromides of ammonium and potassium, and tobacco.

**Anæsthetics** are medicines which produce loss of sensation and consciousness from their effect upon the brain. The term is usually restricted to volatile substances like chloroform, ether, nitrous oxide gas, &c., and does not include narcotics like alcohol and opium, which likewise produce anæsthesia.

**Anæsthetics** *(Local)* are medicines which, when applied directly to a part, destroy its sensibility by their action on the sensory nerves, without injuring the tissues—as ether in the form of spray, carbolic acid solution, ice, veratria, &c.

**Analgesics or Anodynes** are remedies which relieve pain by their action on the brain, or their influence over the conductivity of the sensory nerve-fibre, as—opium, Indian hemp, belladonna, aconite, chloroform, &c.

**Anhidrotics** are medicines which restrain profuse perspiration. They act by their influence over the capillaries of the skin, mostly through the vaso-motor nerves—as belladonna, the vegetable and mineral astringents, and picrotoxine in small doses.

**Antacids.** (See Alkalies.)

**Anthelmintics, Vermifuges, or Antiscolics** are medicines which destroy or cause the expulsion of worms, as santonin for the *round* worm, kousso, kamala, male-fern, turpentine, and pomegranate, for the *tape* and *broad* worms, and injections of salt for the *thread* worm.

**Antagonists** are medicines which act in direct opposition to each other, as strychnia and chloral. They differ from

**Antidotes,** which are medicines that relieve or remove the symptoms caused by poisons. Antidotes are *chemical*, as lime for sulphuric acid; *physiological*, as strychnia for woorara; or *vital*, as mercury for syphilis.

**Antilithics or Lithontriptics** are medicines supposed to possess the power of dissolving various concretions in the body, as the acids for phosphatic, and the alkalies for the uric acid calculi; and Castile soap for gall-stones.

**Antiparasitics** are medicines which destroy *minute* parasites—as sulphurous and carbolic acids, iodide of sulphur, and various mercurial salts.

**Antiperiodics** are medicines which antagonise the poison of periodic disorders like ague. The principal members of the group are quinia, arsenic, iodine and beberia.

**Antiphlogistics** are remedies which were supposed to possess the power of subduing inflammations—as mercury, antimony, venesection, &c.

**Antiseptics** are medicines which prevent putrefaction by destroying the germs causing it. Carbolic acid may be taken as the type of this class. They should not be confounded with Disinfectants like hot air, which destroy the germs causing disease, or with Deodorants like chlorine or charcoal, which destroy fetid smells and emanations.

**Antipyretics** are remedies which reduce the temperature in fevers. They do so either, (1) by their effect on the nervous system; or, (2) by destroying the poison which causes the fever; or, (3) by their action on the skin or circulation; or, (4) they may act by extracting the heat, as the cold-bath does.

Quinia, digitalis, and the vegetable acids belong to this important group.

**Antispasmodics**—Several distinct groups of remedies are included under this heading.

(1) Medicines which *paralyse* the motor centres, as Calabar bean and woorara, or which merely *depress* them, as bromides of potassium and ammonium.

(2) Medicines which produce profound general depression of all the vital functions, as tobacco, aconite, lobelia, hellebore, prussic acid; and many remedies called sedatives.

(3) Medicines which, by stimulating the bowel, cause the expulsion of gas and relieve colic, as assafœtida, cajuput, castor, valerian, and a host of remedies called Carminatives and Aromatics.

**Aphrodisiacs** are medicines which excite the functions of the genital organs, as phosphorus, cantharides, and strychnia.

**Astringents** are remedies which cause contraction of muscular fibre; and condensation of the tissues mostly by precipitation of gelatine and albumen. The most important are tannic and gallic acids, and all substances containing them, the mineral acids, and most metallic salts, alum, creasote, &c.

**Carminatives.** (See Antispasmodics.)

**Cathartics, Aperients, Evacuants, or Purgatives** are medicines which increase or quicken the evacuations from the bowel. They are variously subdivided:—

*a. Laxatives*, which slightly quicken the peristaltic movements, and cause only *softened* motions, as manna, sulphur, figs, prunes, olive oil, &c.

*b. Purgatives proper*, which, by increasing the movements of the intestines and stimulating the glands, cause *semi-fluid* motions, as senna, castor oil, mercurials, aloes, &c.

*c. Drastics*, which act like the former class, only more intensely, and by their local irritant action increase the intestinal fluid, and remove the serum from the intestinal vessels, causing *almost fluid* motions—as scammony, jalap, colocynth, gamboge, podophyllin, and large doses of class *b*.

*d. Hydragogues*, which cause *free* secretion from the intestinal glands, and remove much serum from the blood vessels, producing *fluid* or *watery* motions, as croton oil, elaterium, and many of the remedies in class *c.;* and large doses of various salts, like cream of tartar, Epsom, Glauber, &c., which are often called *saline* purgatives, and which are supposed to act by virtue of their low diffusive powers.

*e. Cholagogue* purgatives, of which podophyllin may be taken as the type, are remedies which were supposed to purge by stimulating the liver, increasing the bile, and causing *greenish liquid* motions; most brisk purgatives are included in this class by writers.

**Cholagogue.** (See Cathartics.)

**Ciliary Excitants** are medicines which, when sucked in the mouth, promote expectoration of bronchial mucus by reflex action—as chloride of ammonium, chlorate of potash, gum acacia, native chloride of sodium, &c.

**Counter-irritants**—Under this heading are included—RUBEFACIENTS, remedies which cause redness of the skin; VESICANTS, which produce inflammation, ending in a blister being formed; REVULSIVES and DERIVATIVES, remedies which are supposed to remove the diseased action from the seat of mischief to the place of their application. Amongst this class are —cantharides, turpentine, ammonia, camphor, mustard, most volatile oils, mezereon, capsicum, croton oil, &c.

**Demulcents** are medicines which protect the parts with which they come in contact, by their oleaginous or mucilaginous qualities shielding them from irritating secretions. Linseed, olive, and almond oils, starch, glycerine, liquorice, &c., are included under this head.

**Diaphoretics** are medicines which increase the cutaneous secretion, either by stimulating the sudoriferous glands during their elimination, as sulphur, or by causing the dilatation of the superficial capillaries, as antimony, ipecacuanha, and all depressing remedies.

**Diluents** are remedies like water and weak fluid foods, which, when taken in quantity, on being eliminated, carry out some solids with them by the kidneys, lungs, or skin.

**Disinfectants and Deodorants** are referred to under Antiseptics.

**Diuretics** are remedies which increase the renal secretion, either by (*a*) stimulating the kidneys during their elimination, as cantharides, juniper, potash salts, &c.; or (*b*) by raising the blood pressure in the glomeruli, as digitalis, squill, casca, &c., &c.; or (*c*) by washing out the kidneys, as large doses of diluents, like water, &c.

**Ecbolics** are medicines which cause contraction of the uterine muscular fibre, as ergot, borax, savin, &c.; in small doses they are emmenagogue.

**Emetics** are medicines which cause the evacuation of the contents of the stomach, either *directly*, by irritating the nerves of the stomach, as sulphates of zinc and copper, mustard, &c., or *indirectly*, by exciting the vomiting centre, as antimony, ipecacuanha, apomorphia, veratria, &c.

**Emmenagogues** are medicines which, by their stimulating action on the uterine fibre, (1) directly assist in restoring disordered menstruation, as ergot, savin, and most ecbolics; or (2) by removing the cause of the suppression, allow the discharge to return, as iron, aloes, strychnia, &c.

**Emollients or Protectives** are external Demulcents, which protect and soothe the parts to which they are applied, from all sources of irritation; or, by their oily nature, they help to relax and soften the tissues, as hot fomentations, poultices, oils, lard, spermaceti, chalk, starch, &c.

**Errhines** are medicines which increase the secretion of the nasal mucous membrane generally without causing sneezing, as the vapour of ammonia, acetic acid, &c.

**Escharotics or Caustics** are substances which destroy the life of the tissue to which they are applied, generally by depriving it of its moisture—as the strong mineral acids, soda, potash, lime, arsenic, chloride of zinc, &c.

**Expectorants** are medicines which assist the expulsion of the bronchial mucus—

(1) By relieving spasm of the bronchial tubes, as lobelia, opium, stramonium, tobacco, &c.

(2) By mechanically dislodging it in the act of vomiting, at the same time thinning the secretion, as all emetics *in large doses*, notably antimony, hippo, &c.

(3) By creating nausea and increasing a flow from the inflamed membrane through their effects upon the vessels, as all the emetic class *in small doses*.

(4) By stimulating the membrane in the act of their elimination, they so alter the secretion that expectoration is

rendered easy, as ammonia, senega, ammoniacum, and a host of volatile substances, notably the onion. Iodide of potassium, by liquifying the secretion, is a valuable expectorant.

(5) By soothing the irritable respiratory centre, morphia and chloral often act as true expectorants, and render the expulsion painless.

(6) By acting through the impression produced on the nerves of the mouth, many substances aid expectoration; see Ciliary excitants, sal ammoniac, &c.

**Galactagogues** are medicines which increase the secretion of the mammary glands, as chlorate of potash, fennel, &c.

**Hæmatics or Hæmatinics** are medicines which enrich the blood by acting as restoratives to the red corpuscles, as iron, and its preparations, manganese and potash in small doses.

**Hypnotics or Soporifics** are medicines which produce sleep without causing any previous cerebral excitement.

**Narcotics** are medicines which produce sleep by their action upon the cerebrum. They are to be distinguished by their initial exciting stage from pure Hypnotics, like chloral and bromide of potassium, &c.; amongst them are opium, morphia, chloroform, Indian hemp, alcohol, and ether.

**Refrigerants** are medicines which reduce the temperature of the body in fever; the term, however, is generally applied to a class of remedies which appear to allay thirst, as the vegetable acids, some mineral acids (much diluted), and many diaphoretics; see Antipyretics.

**Resolvents or Discutients** are medicines which are supposed to cause the absorption of inflammatory or other swellings. They appear to act by stimulating the lymphatics, as iodine, cadmium, &c.

**Restoratives** are medicines which exist already in the healthy blood or tissues, and are given in diseases where the system is supposed to be deficient in them, as iron, potash, phosphorus, chloride of sodium, &c.

**Rubefacients.** See Counter-irritants.

**Sedatives or Depressents** are medicines which depress the action of (1) the nervous system, as tobacco, lobelia, bromide of potassium, &c.; (2) the circulatory system, as aconite, veratrum, prussic acid, &c.; (3) the spinal cord, as Calabar bean.

**Sialagogues** are medicines which increase the secretion of the salivary glands, either by a local irritation, causing reflex activity, as pellitory, mezereon, capsicum, &c.; or by exciting the glands during their elimination, as all the preparations of mercury, iodide of potassium, &c.

**Sternutatories** are substances which, by their irritating action on the nasal mucous membrane, cause sneezing, as tobacco, hellebore, ginger, capsicum, and ipecacuanha, in powder.

**Stimulants***—Under this head may be included a great number of remedial agents. The sub-divisions are vague and misleading; thus there are medicines which excite the spinal cord, as strychnia, phosphorus, &c., such are called spinal stimulants; others exalt the functions of the liver, as the cholagogue purgatives; others the intestines, as calomel, Epsom salt, &c.; others the circulatory system, as digitalis, belladonna, &c.; others the stomach, as carminatives, like spices, &c.; others the skin. These latter are called external stimulants, and include all the counter-irritants.

**Stomachics** are medicines which increase the vascularity of the stomach, promote digestion, and increase the appetite, as hippo, all the bitter tonics, arsenic, aloes in small doses, &c.

**Styptics** are medicines which arrest bleeding by their local astringent action, either by causing coagulation of the blood, or by acting on the muscular tissue of the small vessels. Amongst this class will be found tannic acid, creasote, alum, chloride of zinc, perchloride of iron, &c.

**Sudorifics.** (See Diaphoretics.)

**Tonics** are, strictly speaking, medicines which improve the tone of the part upon which they act; thus it may be on the stomach, as the pure vegetable bitters and all stomachics; or on the cord, as strychnia; or on the heart, as digitalis; or on the nervous system, as quinia and the valerianates; or on the muscular tissue, as tannic acid; or on the circulating fluid, as iron.

**Vesicants.** (See Counter-irritants.)

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* The term "stimulants" is frequently erroneously used as a synonym for alcohol and its preparations, which are true narcotics.

# PART IV.

# THE ADMINISTRATION OF MEDICINES.

There are various routes by which medicines may find their way into the circulating fluid. The most direct would be

(1) *By injection into the veins*, as ammonia, saline solutions and milk are injected in desperate emergencies, or as blood may be transfused in excessive hæmorrhages.*

(2) Some authorities recommend the *injection* of the remedy *into an artery*.

(3) By *inhalation*, the vapour of the substance finding its way rapidly into the circulation through the extensive sheet of pulmonary blood vessels, as in the administration of anæsthetics.

(4) By *swallowing*—the commonest and most convenient method—the medicines finding their way through the walls of the gastro-intestinal blood vessels, or lacteals, into the current.

(5) By absorption from the *rectum;* in this way the great majority of substances (in the form of enemata or suppositories) may find their way into the blood.

(6) By the *vaginal* surface in the female, when given in the form of pessary.

(7) By the *bladder*. Some experimentalists have influenced the system rapidly by narcotic remedies injected into the vesical cavity.

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* The ordinary aspirator (Dieulafoy's) can be safely used for this purpose if the two rubber tubes be made exactly alike, and each rendered capable of bearing one of the large needles at one end, while the other end is connected with the cylinder of the machine. In this way a thoroughly reliable transfusion apparatus can be always at hand.

(8) By absorption from the *deep tissues*, as strychnia is often injected into the centre of a large muscle, by the method known as that of "*parenchymatous injection.*"

(9) By the *hypodermic method;* a solution of the substance being injected by a fine syringe* into the *subcutaneous areolar tissue*, from which it is rapidly absorbed by the small blood vessels and lymphatics. In this way morphia is best given to relieve severe pain, and ether to counteract the shock of formidable hæmorrhages.

(10) By the skin. Through the cutaneous tissue medicines may be administered with the view of affecting the system, by four methods:—

1. THE ENEPIDERMIC.
2. THE EPIDERMIC OR IATROLEPTIC.
3. THE ENDERMIC.
4. BY INOCULATION.

In the *Enepidermic* method friction is not employed; the medicine to be so administered is simply placed in contact with the skin. Though this is, at the best, a slow and uncertain way to introduce a remedy into the circulation, the results of experiments show that the alkaloids, dissolved in chloroform, when placed in contact with the unbroken skin are readily absorbed, and soon find their way into the blood. Watery or alcoholic solutions either do not enter the blood at all when administered in this way, or are absorbed in such small quantities that they may be regarded as inert.

By the *Epidermic* method the medicine is also introduced into the system through the unbroken cuticle, but friction is employed. In this way we administer cod-liver oil in wasting diseases, and mercurial ointment in syphilis.

By the *Endermic* method the difficulty of absorption through the cuticle is obviated by its removal. This is accomplished by soaking a piece of porous fabric in strong solution of ammonia, applying it to the surface of the skin, and instantly covering it over with a piece of oiled silk, or a watch-glass, when speedy vesication ensues. The remedy, in the state of fine powder, should be dusted over the denuded spot, and its rapid absorption occurs. In this way morphia, strychnia, or atropia, can be administered. The same result follows if the remedy be applied over a portion of skin whose cuticle has been removed by an ordinary cantharides plaster.

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* It may not be out of place here to remind the student that the ordinary hypodermic syringe (commonly known as Wood's) can be used as an aspirator for all diagnostic purposes, in every respect equal to, and in many decidedly superior to, the most improved instruments. The piston must fit *perfectly*, and the cylinder should be partially filled with water, when the needle may be thrust into the tissues in search of the suspected pus. A few turns of the piston inject a harmless quantity of water which clears the needle, and allows the puriform liquid to ascend on the motion being reversed; a single drop of pus is evident, as it wells up through the column of clear water. All superficial and most deep abscesses may be detected in this way, and pleural fluid can be easily demonstrated.

By the process of *Inoculation*, as for small-pox, remedies may be introduced into the system through the punctured cuticle.

These different methods or routes by which medicines find their way into the system should not be confounded by the student with the various *local* methods of applying remedies. Thus sternutatories are applied to the nasal mucous membrane, and substances, by the method of insufflation, are brought in contact with the posterior nares and surrounding parts; or the nasal douche may be employed with the same intention. Sialagogues are used to act on the salivary glands through stimulation of the mucous membrane of the mouth.

The fauces and tonsils are reached by gargles, and the larynx by atomized spray; while the bronchial mucous surface may be exposed to the local action of various inhalations, or to the fumes of volatile substances in a state of combustion.

In the same way, most of the cavities of the body, all tortuous wounds, and open sores, may be reached by injections, lotions, bougies, pessaries, suppositories, &c.

## DOSAGE OR POSOLOGY.

Before the student considers the question of prescription writing, it will be necessary to say a few words about the doses of medicines. As the alphabetical arrangement of this work will enable him to find at a glance the dose of every preparation and drug in the Materia Medica; and in a similar way, under Pharmacy, the doses of all the various Galenical preparations are tabulated; it will thus be unnecessary here to have any repetition in the form of tables or lists of doses.

The British Pharmacopœia has been the authority almost universally regarded as final in all questions of dosage, but the progress of Therapeutics, moving much more rapidly than the Pharmacopœial authorities issue their amended editions, various inconsistencies may be noticed.

The maximum *official* dose of succus conii, for example, is one dram, whilst the best authorities give ten times this amount habitually; the same be said of the maximum dose of quinia, tinctures of digitalis and hyoscyamus, and a few less important remedies.

The minimum dose of morphia, strychnia, and tinctures of aconite and belladonna, are too large; and every day experience proves that the maximum dose of the tincture and extract of nux vomica, if given, might cause unpleasant symptoms.

Though the official doses may, with the above few exceptions, be regarded as safe guides, still the student must remember that there are many conditions which modify very considerably the effect of remedies, and should materially affect their dosage.

The most important of these modifying agents are:—

AGE,

IDIOSYNCRASY,

HABIT,

INTERVAL BETWEEN THE DOSES,

DISEASE,

CLIMATE,

RACE AND TEMPERAMENT,

FORM IN WHICH THE MEDICINE IS ADMINISTERED.

ACCUMULATION, &C.

*Age*—This is the most important factor in determining the amount of the dose, and is the one which gives most trouble to the student. Though no reliable rule can be laid down for his guidance in all cases, the following plans of Gaubius and Young may be serviceable when memory fails in recalling the exact amount of dose recommended by posologists. In the Materia Medica portion of this book, the dose for a child one year old is given under the heads of the most frequently employed infantile remedies. It should be remembered that children bear opiates very badly, and their use, consequently, is unsafe for children under one year old, even in most minute doses.

This intolerance of opium, it may be, has led to very erroneous ideas about the amount of the dose of other remedies for children.

Children will often bear nearly as full doses as adults of various remedies, as may be seen in the case of arsenic, calomel, squill, belladonna, ipecacuanha, and many purgatives, like rhubarb, jalap, &c.

Gaubius took the average adult dose of a remedy as 1, say 1 grain, and calculated the requisite amount for the different ages thus:—

| | |
|---|---|
| For a child 1 year old, ... ... | $\frac{1}{13}$ to $\frac{1}{12}$ grain. |
| For a child 2 years old, ... ... | $\frac{1}{8}$ grain. |
| For a child 3 years old, ... ... | $\frac{1}{6}$ grain. |
| For a child 4 years old, ... ... | $\frac{1}{4}$ grain. |
| For a child 7 years old, ... ... | $\frac{1}{3}$ grain. |
| For a child 14 years old, ... ... | $\frac{1}{2}$ grain. |
| For a patient 20 years old, ... ... | $\frac{2}{3}$ grain. |
| For a patient from 21 to 60 years old, | 1 grain. |

Young's rule is, "That for children under 12 years the doses of most medicines must be diminished in the proportion of the age to the age increased by 12."

If the student wishes to find out the dose for a given age by this method, he has simply to add 12 to the age in years, and divide the age by the amount thus obtained, the answer giving a fraction, which is the required amount of the full adult dose. Thus, suppose the adult dose to be 1 grain, the dose will be:—

| | | | |
|---|---|---|---|
| For a child 1 year old, ... | $\frac{1}{1+12}$ | = | $\frac{1}{13}$ grain. |
| For a child 2 years old, ... | $\frac{2}{2+12}$ | = | $\frac{1}{7}$ grain. |
| For a child 3 years old, ... | $\frac{3}{3+12}$ | = | $\frac{1}{5}$ grain. |
| For a child 8 years old, ... | $\frac{8}{8+12}$ | = | $\frac{2}{5}$ grain. |
| For a child 12 years old, ... | $\frac{12}{12+12}$ | = | $\frac{1}{2}$ grain. |

*Idiosyncrasy*—The physician meets with individuals in whom an ordinary dose of some well-known drug causes symptoms more intense, or entirely different from those usually observed to follow its administration, and when these cannot be accounted for by any known law, the case is generally spoken of as one of idiosyncrasy.

Patients are occasionally met with in whom the smallest dose of calomel will be followed by profuse salivation, whilst enormous doses of opium and chloroform are sometimes borne by those unaccustomed to their use.

*Habit* determines the dose of some medicines more than any other influence; this is particularly true of narcotics. Many instances are recorded of opium eaters who took a pint of laudanum daily without experiencing the soporific effects of the drug, and the arsenic eaters of Styria are examples of the same.

The *interval between the doses* should determine to a large extent the amount of the dose; this is too frequently overlooked in tables. No rule can, however, be laid down on the subject, but the student should be guided by the nature of the action of the medicine, the effects required to be produced by it, and the rate of its absorption, &c.

*Disease* modifies considerably the dose of a medicine; instances of this have been already pointed out in the large quantities of opium needed in desperate inflammations and intensely painful conditions of various nerves. Mercury and opium are badly borne in albuminuria, whilst to syphilitic children large quantities of grey powder can be freely given.

*Climate, Temperament, Sex, Stature, &c.* possess varying effects upon the amount of medicine required to produce its results in a healthy individual, and some *conditions of the medicine* itself (chiefly those which relate to its rate of absorption or elimination), affect materially the amount of the dose.

The *method by which the medicine is administered* affects the dose; thus, as a rule, the dose of remedies given by the rectum requires to be twice as great as if given by the mouth. Strychnia is an exception, being more active if given by the bowel than if swallowed. The dose may be said to be about a half, or two-thirds, of the ordinary quantity when administered by the hypodermic method.

*Accumulation* modifies to some extent the dose of a medicine. After digitalis, strychnia, and bromide of potassium have been administered for a time, some observers have noticed the sudden onset of the marked physiological symptoms produced by these remedies. In such a case the dose must be diminished or suspended; and after its renewal the interval between the doses should be lengthened.

## INCOMPATIBILITY.

It is of the utmost importance that the physician should avoid ordering remedies which, when mixed, destroy each other's virtues. Incompatibility is generally said to be threefold:—

CHEMICAL.

THERAPEUTICAL.

PHARMACEUTICAL OR ABSOLUTE.

Of the first may be instanced syrup of squill and salvolatile; acetate of lead and sulphuric acid, or sulphate of zinc; iron, and the numerous substances containing tannic acid.

As an example of the second form of incompatibility may be mentioned a mixture, or pill, containing strychnia and Calabar bean.

Substances are said to be *absolutely* incompatible when they cannot be mixed together by the pharmacist, as borax and mucilage, or one part of tincture of tolu, myrrh, or benzoin, ordered with 7 of water.

Experience proves that many compounds, regarded formerly as incompatible, are valuable combinations. It does not follow if a mixture be *inelegant* that it is worthless, though some consider such should be regarded as incompatibles and never employed. The official Mist. Ferri Co. and Mist. Ferri Aromat. may be cited as useful preparations, though instances of incompatibles.

Unfortunately, no rules can be laid down to prevent the student ordering substances which oppose each other in their action in the system, or which chemically decompose each other, or which will refuse to take the intended shape from the hand of the dispenser. Nevertheless, a fair preliminary knowledge of chemistry and pharmacology will generally prevent such a mistake.

Amongst the various general rules of incompatibility there is one which the student should remember—that a *drug should never be ordered in combination with any of its Tests or Antidotes.*

The most important cases of incompatibility being mentioned under the head of the respective substances in the Materia Medica portion of this work, no enumeration need be here made of them.

The substances in the following short list can be combined with so few preparations, that the student will be wise to order them alone in simple solution:—

PERMANGANATE OF POTASH.

TANNIC AND GALLIC ACIDS.

CORROSIVE SUBLIMATE.

IODIDE OF POTASSIUM.

Salts of Lead.
Salts of Zinc.
Iodine and its Liquid Preparations.
Nitrate of Silver.
Sulphuric Acid.
Tincture of Guaiacum.
Citrate of Iron and Quinia.
Free Chlorine in Solution.

The various prescriptions scattered throughout the portion of this work devoted to Therapeutics will materially assist the student in selecting elegant and useful forms in which to administer the most important remedies. Some, indeed, of these may be open to the objection of containing incompatible substances, as iodide of potassium and corrosive sublimate; but where a combination has been proved by experience to be valuable, its inelegance or supposed incompatibility has been occasionally over-looked.

## THE COMBINATION OF MEDICINES.

The compounds of the last generation, containing numerous absurd, and incompatible ingredients, have, it is to be feared, forced many into the opposite extreme of simplicity. In this way combinations of remedies of the utmost value have fallen into disuse.

Paris pointed out the great advantages to be derived from a judicious combination of medicines; thus he found that the action of a medicine may be increased by combining several different preparations of it. Suppose, for example, we wish to get *all* the virtues of cinchona, we obtain them best from a mixture like the following :—

℞.
*Ext. Cinchonæ Liq.* ʒij.
*Tinct. Cinchonæ Flav.* ℥j.
*Decoct. Cinchonæ Flav.* ℥iv.
*Infus. Cinchonæ Flav. ad* ℥x. *misce.*

Fordyce showed that a much more valuable and reliable remedy may be obtained by combining various substances whose actions resemble, or are identical with, each other. Thus, the best diuretic would be a mixture of digitalis, squill, broom, and bicarbonate of potash, infinitely superior to a proportionate dose of any one of them when administered singly.

The action of some medicines is increased by combining with them substances, the previously known qualities of which would have given no clue to their usefulness in this respect; thus, the diuretic power of digitalis and squill is intensified by mercury.

By the judicious combination of two or more remedies we are often enabled to correct undesirable qualities possessed by one of them; thus, alkalies correct the griping of aloes, and hyoscyamus that of colocynth; arsenic prevents the acne which follows the administration of bromide of potassium; and atropia corrects the unpleasant symptoms caused by a hypodermic dose of morphia.

By a proper regulation of the dose of various remedies of the same class, though differing in their methods of action, occasionally, a better compound may be obtained, as pointed out by Paris; thus, by giving a cholagogue with a saline, more effectual purgation is obtained; or by combining bromide of potassium with a narcotic a hypnotic can be procured, which is more satisfactory in its operation than most sleep producers.

## WEIGHTS, MEASURES, AND SYMBOLS USED IN PRESCRIBING.*

The weights referred to in prescribing are of the official system, which starts with the Troy grain and ends with the Avoirdupois pound.

| | | | |
|---|---|---|---|
| 1 Grain, | *gr.* | = | 1 grain. |
| 1 Ounce, | *oz.* | = | 437·5 grs. |
| 1 Pound, | *lb.* | = | 7,000 grs. |

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* At the end of this book, before the Index, will be found a full table of the official Weights and Measures.

The official measures of Capacity which are generally met with in prescriptions are:—

1 Minim, *min.* = 1 minim = ·91 grs. of water.
1 Fluid Dram, *fl. drm.* = 60 minims = 54·68 „ „
1 Fluid Ounce, *fl. oz.* = 8 fluid drams = 437·5 „ „

It will thus be noticed that there is no *official weight* between 1 grain and 1 ounce; but the ʒi and ℈i, which represented the $\frac{1}{8}$ and $\frac{1}{24}$ part of the old Troy ounce, are still permitted to exist under protest. They are, when used in a prescription, to be taken as meaning 60 grs. and 20 grs. respectively, and not the $\frac{1}{8}$ and $\frac{1}{24}$ of the Avoirdupois ounce, which would be 54·68 and 18·22 grains respectively.

The French Gramme, = 15·432 grs.

The following are the symbols and signs met with in prescription writing; they must not be confounded with the *official* symbols, which are simply the first two letters of the English words, as fl. oz., fl. drm., &c.

Gr. = Granum, 1 grain = $\frac{1}{480}$ of a Troy ounce, or $\frac{1}{437}$ of an Avoirdupois ounce.

℈. = Scrupulum, 1 scruple = 20 grains.

ʒ. = Drachma, 1 dram = 60 grs. or 3 scruples or $\frac{1}{8}$ of a *fluid* ounce or 60 minims.

℥. = Uncia, 1 ounce = 1 Troy oz. (480 grs.) or 1 fluid oz. (480 minims), or 437·5 grains of water.

M. = Minimum, 1 minim = $\frac{1}{60}$ part of a fluid dram.

Gtt. = Gutta, 1 drop erroneously supposed to represent 1 minim.

O. = Octarius, 1 pint = 20 fluid ounces, or 1¼ lbs. of water.

C. = Congius, 1 gallon = 8 pints, or 10 lbs. of water.

## DOMESTIC MEASURES.

A teaspoonful—Cochleare minimum = 1 fluid dram (ʒj.)
A dessertspoonful—Cochleare medium = 2 fluid drs. (ʒij.)
A tablespoonful {Cochleare amplum, or / Cochleare magnum} = 4 fluid drs. or ½ oz. (ʒiv.) or ℥*ss*.
A wine-glassful—Cyathus vinarius = 2½ fluid oz. (℥ii*ss*.)

The practice of measuring medicines in spoons is open to very serious objections, since seldom will two be found just alike in capacity; and the physician should make a rule of examining the spoon and ascertaining its dimensions before the patient uses it as a measure. The common "kitchen" spoon, which is generally made of iron and coated over with tin, fluctuates less in size than the other domestic measures; it can be relied upon as holding two fluid drams. The wine-glass is generally stated to contain 1½ to 2 oz. It will, however, be nearly always found to contain at least 2½ oz., or the eighth part of an Imperial pint.

A small tea-cup contains on an average about 7 fluid ounces, and a breakfast-cup about 12 fluid ounces. These figures are much above those mentioned in most books.

An ordinary tumbler holds generally half a pint. In all cases where the physician prescribes an *active* medicine he should order the dose to be measured in a graduated glass.

The mistake of counting drops as minims has been already referred to in the Pharmacy Section (p. 9).

## PRESCRIPTION WRITING.

In one sense, this may be said to be the highest accomplishment of the educated physician, since it requires for its correct performance an intimate knowledge of all the medical sciences and a practical acquaintance with the art of Pharmacy. It is to be regretted that a more intimate knowledge of this latter art is not cultivated by the student of medicine. There could scarcely be a more erroneous idea than that which one occasionally meets with—*i.e.*, that Pharmacy is beneath the notice of the physician.

The writer believes there are very few things which give so great advantages in after life to the physician as an intimate acquaintance with this art.

The Model Prescription should consist of the following parts:—

1. The Superscription.
2. The Inscription.
3. The Subscription.
4. The Signature.

The *Superscription*, which consists of the letter R, originally was used, it is supposed, to represent the symbol for the planet Jupiter, at a time when much of the virtue of a combination appeared to rest upon the deity or presiding star. By common consent, it is now regarded as representing the imperative mood of the Latin verb Recipio, to take; and the French, accordingly, commence their prescriptions with P. or Prenez.

2. The *Inscription* may be called the *body* of the prescription; it includes the names of the substances to be administered, with their quantities, written in Latin, and, as it is the most important part of the prescription, it will be referred to presently at more length.

3. The *Subscription* is made up of the directions (in Latin) for the guidance of the dispenser; thus, *misce*, often written *m*, is frequently the only part in a prescription which belongs to the subscription.

4. The *Signature* includes the directions or instructions intended for the benefit of the patient. They are frequently written by the prescriber in English, and many recommend that Latin should never be used for this part of the recipe.

Mistakes are certainly more liable to occur if the signature be written carelessly, or if incorrect Latin be employed, but the same reasons which have determined the use of this language for prescriptions from an early time, apply equally well to the signature. Thus, a prescription written in Latin can be read and understood in every civilised country. Abbreviations and contractions can be employed without fear of being misunderstood, which could not be the case if any other language were substituted; we are thus often able, by a single letter, to express the meaning of several English words.

It is often absolutely *necessary* to write the inscription in such a way that the patient may remain innocent of the nature of its contents.

The use of long and elaborate Latin phraseology is to be condemned in prescribing, and the student, when he feels any difficulty in expressing himself in this tongue, had certainly better fall back upon his English when writing the signature.

The patient's name is written at the top or bottom of the recipe, preferably the top, as it is thus less liable to be overlooked or mistaken, than if written where space is often limited. The prescriber's initials generally follow at the right hand corner, and the date is written opposite.

☞ The student should not confound the *initials* of the prescriber with that portion of the prescription called the signature—*i.e*, the directions to the patient.

It is hardly necessary to remind the student of the necessity of writing clearly and legibly, and avoiding the use of contractions which might lead to mistakes.

The *body* or inscription in a model prescription should contain the following:—

The *Basis* or principal active ingredient.

The *Adjuvant*, or *Auxiliary*, to assist its action.

The *Corrective*, to correct or diminish some undesirable quality.

The *Vehicle*, or *Excipient*, to give a suitable form for administration.

The following prescription may be regarded as a very commonly ordered combination of remedies:—

℞. - - - - SUPERSCRIPTION.

| | | |
|---|---|---|
| (Basis.) | *Pot. Acet.* ʒv. | INSCRIPTION |
| (Adjuvant.) | *Tinct. Digitalis* ʒj. | |
| (Corrective.) | *Syr. Aurantii* ℥j. | |
| (Vehicle.) | *Decoct. Scoparii ad* ℥viij. | |

*Misce. fiat mist.* - - - SUBSCRIPTION.

*Cpt. cochl. mag.* ii. *4ta. q. q. hora ex paul. aquæ.* SIGNATURE.

Without abbreviations or contractions, it would read thus—

Recipe.

*Potassæ Acetatis drachmas quinque.*

*Tincturæ Digitalis drachmam unam.*

*Syrupi Aurantii unciam unam.*

*Decocti Scoparii ad uncias octo.*

*Misce, fiat mistura. Capiat cochlearia duo magna quarta quâque hora ex paululo aquæ.*

The student will find benefit from a careful study of the following pages, in which the Latin of the above prescription is arranged according to the English idiom, and each word parsed and translated.

*Latin Idiom:*

Recipe Potassæ Acetatis drachmas quinque.

| | | |
|---|---|---|
| ℞. (Recipe) ... | v. irr. tr. im. m. 2nd per. s., to agree with its nom. *Tu*—"thou" (understood). Rule i., recipi-o, recep-i, receptum, recipere. From re and capio. | Take thou |
| V (quinque) ... | num. ad. indec. ac. pl. qual. and agreeing with drachmas. Rule ii. | five |
| ʒ (drachmas) ... | n. f. ac. pl. Rule viii.(*a*)drachma—æ. | drams |
| *Acet.* (acetatis) | n. f. gen. s. qual. drachmas. Rule vi.(*a*), acetas—atis. | of acetate |
| *Pot.* (potassæ)... | n. f. gen. s. qual. acetatis. Rule vi.(*a*), potassa—æ. | of potash. |

*Latin Idiom:*

Recipe Digitalis Tincturæ drachmam unam.

| | | |
|---|---|---|
| ℞. (Recipe) ... | (understood) .. .. .. | Take thou |
| j (unam) ... ... | num. adj. ac. s. qual. and agreeing with drachmam. Rule ii., unus—a—um. | one |
| ʒ (drachmam ... | n. f. ac. s. gov. by recipe. Rule viii.(*a*), drachma—æ. | dram |
| *Tinct.* (tincturæ) | n. f. gen. s. qual. drachmam. Rule vi.(*a*), tinctura—æ. | of the tincture |
| *Digit.* (digitalis) | n. f. gen. s. qual. tincturæ. Rule vi.(*a*), digitalis—is. | of digitalis. |

*Latin Idiom:*

Recipe Aurantii Syrupi unciam unam.

| | | |
|---|---|---|
| ℞. (Recipe) ... | (understood) .. .. .. | Take thou |
| j. (unam) ... | (Parsed as before) .. .. | one |
| ℥ (unciam) ... | n. f. ac. s. gov. by recipe. Rule viii.(*a*), uncia—æ. | ounce |
| *Syr.* (syrupi) ... | n. m. gen. s. qual. unciam. Rule vi.(*a*), syrupus—i. | of syrup |
| *Aur.* (aurantii) | n. neu. gen. s. qual. syrupi. Rule vi.(*a*), aurantium—ii. | of orange-peel |

*Latin Idiom :*

Recipe Decocti Scoparii ad uncias octo.

| | | |
|---|---|---|
| ℞. (Recipe) ... | (understood) .. .. .. | Take thou |
| *Ad.* ... ... ... | prep. used adverbially. | up to |
| viij. (octo) ... | num. adj. indec. qual. uncias. Rule ii. | eight |
| ℥ (uncias) ... | n. f. ac. pl. gov. by recipe, uncia—æ. | ounces |
| *Decoct.** (decocti) | n. neu. gen. s. qual. uncias. Rule, vi.(*a*) decoctum—i. | of the decoction |
| *Scop.* (scoparii) | n. masc. gen. s. qual. decocti. Rule vi.(*a*), scoparius—ii. | of broom. |

*Latin Idiom :*

Misce. Fiat mistura.

| | | |
|---|---|---|
| *M.* (misce) ... | v. trans. imp. m. p. t. agreeing with and gov. by (tu) understood. Rule i., misceo—ui, mixtum or mistum, miscere. | Mix you, or mix |
| *Mis.* (mistura)... | n. f. nom. s. governing fiat. Rule i., mistura—æ. | let the mixture |
| *Ft.* (fiat) ... ... | v. used as passive of facio, pres. sub. 3rd s. used as imp. gov. by and agreeing with mistura ; fio, factus sum, fieri ; to be made or become. | be made. |

*Latin Idiom :*

Capiat cochlearia magna duo quarta quâque horâ ex aquæ paululo.

| | | |
|---|---|---|
| *Cpt.* (capiat) ... | irr. v. tr. sub. m. pr. t. 3rd per. s. agreeing with and gov. by (is) understood. Rule i., capio, cepi, captum, capere, the present subjunctive used as an imperative. Rule x.(*a*). | He may take, or let him take |
| ij. (duo) ... ... | num. adj. ac. pl. neut. qual. and agreeing with cochlearia. Rule ii., duo—æ—o. | two |

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* Some authorities would put Decoct. in the accusative, governed by recipe. In the same way, where the student meets *Aquæ ad* ℥—, in the different prescriptions throughout the Third Part of this work, he may substitute *Aquam ad* ℥— but this latter is by no means so idiomatic as *Aquæ ad* ℥—

---

| | | |
|---|---|---|
| ***Mag.*** (magna) ... | adj. ac. pl. neut. qual. and agreeing with cochlearia. Rule ii., magnus—a—um. | large |
| *Coch.* (cochlearia) | n. ac. pl. neut. gov. by capiat. Rule viii.(*a*), cochleare—is. | tablespoonfuls |
| *q.q.* (quâque) ... | pron. indef. abl. s. qualifying & agreeing with hora. Rule ii., quisque, quæque, quodque. | at each |
| 4ta (quarta) ... | num. adj. abl. s. qualifying and agreeing with hora. Rule ii., quartus—a—um. | fourth |
| *Hora* ... ... | n. f. abl. s. Rule ix.(*a*), hora—æ. | hour |
| *Ex* ... ... ... | prep. Rule ix.(*c*). | out of |
| *Paul.* (paululo) | adj. abl. s. used as a noun, gov. by ex, paululus—a—um. | a little |
| *Aq.* (Aquæ) ... | n. f. gen. s. qual. paululo. Rule, vi., aqua—æ. | of water. |

## GRAMMATICAL AIDS TO PRESCRIPTION WRITING.

Two languages differ in *words*, *inflexions*, and *idioms*.

A student who wishes to read the Latin language must thus understand the *meaning* of its words; the *force* of its inflexions; and the *nature* of its idioms.

As far as *words* are concerned, a limited knowledge of this language, and one sufficient for the intelligent reading and writing of physicians' prescriptions, may be obtained from the following brief vocabulary.

The *inflexions* may be learned from any Latin Grammar;* whilst the student may obtain a fair conception of the *idioms* or order of words from a careful study of the few important rules of Syntax which follow.

### A FEW RULES OF LATIN SYNTAX APPLICABLE TO THE CONSTRUCTION OF PHYSICIANS' PRESCRIPTIONS.

*Syntax* is generally divided into two parts—CONCORD and GOVERNMENT.

Concord is the agreement between two Latin words, one influencing the other. There are three concords:—

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* As Cooley's Pharmaceutical Latin Grammar (Groombridge & Sons, London), or, preferably, Ince's new Grammar (Bailliere, Tindall, & Cox, London, 1882).

1. A Verb, with its subject (as Rule I.)
2. Adjectives, with the nouns which they qualify. (Rule II.)
3. The Relative, with its antecedent. (Rule III.)

### RULE I.

A personal verb agrees with its subject or nominative in number and person; as, *Ego tero*—I rub; *Tu sumas*—You may take; *Id fiat*—It may be done.

In prescription writing, the *active* voice of verbs is generally only used in the 2nd person singular of the imperative mood, and 3rd person singular or plural of the present subjunctive.

The use of the *passive* voice is generally confined to the 3rd person singular or plural of the present subjunctive, and the different parts of the gerundive.

### RULE II.

Adjectives, participles, and pronouns, whether belonging to the subject or the predicate, agree in gender, number, and case with the noun or the pronoun to which they refer; as, *Pulvis unus*—One powder; *Uncia una*—One ounce; *Sevum præparatum*—Prepared suet.

### RULE III.

The relative must agree with its antecedent in gender, number and person; as, *Syrupus qui optimus est*—The syrup which is best; *Mistura quæ bona est*—The mixture which is good; *Medicamentum quod neglectum est*—The medicine which has been neglected.

### RULE IV.

If a verb has more than one subject the verb must be put in the plural number; as, *Pilula et mistura capiantur*—The pill and mixture are to be taken.

### RULE V.

A participle governs the same case as the verb to which it belongs; as, *Augendo quantitatem*—By increasing the quantity.

### RULE VI.

The Genitive case primarily signifies the class to which a thing belongs; therefore—

*(a)* It depends on another noun as a notion which it qualifies or determines; as, *pulveris granum*—a grain of powder.

*(b)* Or it is used to signify the whole from which a part is taken; as, *nimium doloris*—too much (of) pain.

*(c)* Adverbs of quantity, time, place, &c., govern the partitive genitive; as, *satis aquæ*—enough (of) water.

*(d)* Adjectives of plenty or want govern a genitive or ablative; as, *dives quiniæ*—rich in quinia; *dives aqua*—rich in water.

### RULE VII.

Dative.—The sign of the dative case is *to* or *for*.

*(a)* Adjectives which imply likeness or unlikeness, advantage or disadvantage, &c., govern the dative; as, *ceræ similis* —like to wax.

*(b)* Verbs of giving or imparting, &c., govern the dative of the indirect object as well as the accusative of the direct object: *contusam liquori redde*—return the bruised (substance) to the liquor.

### RULE VIII.

Accusative.—The accusative was originally used to mark the immediate object of an action.

*(a)* Transitive verbs in the active voice generally govern the accusative case; as, *citratem calcis lava*—wash the citrate of lime.

*(b)* The following prepositions govern the Accusative:—

| | |
|---|---|
| *Ad* ... ... ... ... | To, at, for. |
| *Adversum, adversus* ... ... | Against, towards. |
| *Ante* ... ... ... ... | Before. |
| *Apud* ... ... ... ... | At, with. |
| *Circum* ... ... ... | Around. |

| | |
|---|---|
| ***Contra*** | Against. |
| ***Extra*** | Outside. |
| ***Infra*** | Below. |
| ***Inter*** | Between, among. |
| ***Ob*** | On account of |
| ***Per*** | Through, by. |
| ***Pone*** | Behind. |
| ***Post*** | After. |
| ***Prope*** | Near. |
| ***Secundum*** | Following. |
| ***Supra*** | Above. |

*(c)* The following prepositions govern the Ablative as well as the Accusative :—

| | |
|---|---|
| ***In*** | (ac.) Into ; (ab.) in. |
| ***Sub*** | (ac.) Under ; (ab.) near. |
| ***Subter*** | (ac. and ab.) Under. |

## RULE IX.

The Ablative received its name because it signifies ablation, or separation, the sign of which is *from.*

*(a)* Cause, manner, means, instrument, time when, and place where, are put in the ablative; as, ***balneo arenæ***—in a bath of sand.

*(b)* ***Opus*** and ***usus*** are followed by an ablative ; as, ***cibo opus est nobis***—we have need of food.

*(c)* The definite answer to the questions "when" or "how" is expressed by a noun or pronoun and a participle in the ablative case, and is called the ablative absolute; as, *liquoribus omnibus mixtis*—all the liquors having been mixed.

The following prepositions govern the Ablative:—

| | |
|---|---|
| *A, ab, abs* | Away, from, by. |
| *Cum* | With. |
| *De* | Down, from, of, about. |
| *E, ex* | Out of, from, after. |
| *Præ* | Before, because of. |
| *Pro* | For, before, according to. |
| *Sine* | Without. |

*(d)* *Utor*, *abutor*, and a few other verbs govern the ablative; as, *utatur sequenti*—let him use the following.

### Rule X.

The imperative mood is used to express requests or commands; as, *Recipe*—Take (thou).

*(a)* The present subjunctive mood is often used instead of the imperative; as, *fiat mistura*—let the mixture be made.

## LATIN WORDS AND PHRASES MOST FREQUENTLY USED IN PRESCRIPTIONS, FULLY EXPLAINED.*

*Ad 3tiam vicem* = ad tertiam vicem. For three times.

*Ad lib.* = ad libitum. (*ac.*, *s.*, *libitus-i.* *Rule* viii.) At pleasure.

*Add* = Adde, *im*, *m.* (*addo*, *-didi*, *-ditum*; *-ere.*) Add.

*Admov.* = Admove, *im*, *m.* (*admoveo*, *-vi*, *-tum*, *-ere.*) Apply.

*Alternis Horis.* (*ab. pl.* *Rule* ix.) Every other hour.

---

* Abbreviations Used.—*ab.* or *abl.*, ablative; *ac.*, accusative; *ad.* or *adj.*, adjective; *adv.*, adverb; *conj.*, conjunction; *f.* feminine; *gen.*, genitive; *im.* or *imp.*, imperative; *indec.*, indeclinable; *indef.*, indefinite; *irr.*, irregular; *m.* or *masc.*, masculine; *m.* or *mo.*, mood; *n.* or *no.*, noun; *nom.* or *no.*, nominative; *num.*, numeral; *neu.*, neuter; *pas.*, passive; *part.*, participle; *p.*, *pr.*, or *pres.*, present; *pl.*, plural; *prep.*, preposition; *pron.*, pronoun; *s.*, singular; *sub.*, subjunctive; *t.*, tense; *tr.*, transitive; *v.*, verb.

***Amplus*** (*-us, -a, -um., adj.*) Large.

***App.*** = Applicandum. (*-us, -a, -um, gerundive.*) To be applied.

***A., aa.*** = Ana. (*Greek prep.*) Of each.

***Aq.*** = Aqua. (*-æ, n. f.*) Water.

***Aq. Bull.*** = Aqua Bulliens. (*-entis, adj.*) Boiling water.
*,, Com.* = ,, Communis. (*-is, -e, adj.*) Common ,,
*,, Dest.* = ,, Destillata. (*-us,-a,-um,adj.*) Distilled ,,
*,, Ferv.* = ,, Fervens. (*-entis, adj.*) Hot ,,
*,, Font.* = ,, Fontalis. (*-is, -e, adj.*) Spring ,,
*,, Mar.* = ,, Marina. (*-us, -a, -um, adj.*) Sea ,,
*,, Niv.* = ,, Nivalis. (*-is, -e, adj.*) Snow ,,
*,, Pluv.* = ,, Pluvialis. (*-is, -e, adj.*) Rain ,,

***Aut*** (*conj.*) Or.

***Bene*** (*adv.*) Well.

***Bis Ind.*** = Bis Indies. (*adv.*) Twice a day.

***Cpt.*** = Capiat. (*pr. sub. 3rd per. s., capio, cepi, captum capere. Rule* x.) Let the patient take.

***Cibus*** (*-us, -i, n. masc.*) Food.

***Cooh.*** = Cochlear, Cochleare, or Cochlearium. (*n. neu.*) A spoonful.

***Cochleat.*** = Cochleatim. (*adv.*) By spoonfuls.

***Cooh. Amp.*** = Cochlear (*-aris*) Amplum. (*-us, -a, -um, adj.*) A tablespoonful.

*,, Mag.* = Cochlear (*-aris*) Magnum. (*-us, -a, -um, adj.*) A large spoonful.

*,, Med.* = Cochlear (*-aris*) Medium or Modicum. (*-us, -a, -um, adj.*) A dessert-spoonful.

*,, Min.* = Cochlear (*-aris*) Minimum. (*-us, -a, -um, adj.*) The smallest teaspoonful.

*,, Parv.* = Cochlear (*-aris*) Parvum. (*-us, -a, -um.*) A teaspoonful.

***Coll.*** = Collyrium. (*-ii, n. neu.*) An eye-wash.

***Comp.*** = Compositus. (*-us, -a, -um, part.*) Compounded.

***Co.*** = Compositus. (*-us, -a, -um, adj.*) Compound.

***Cong.*** = Congius. (*-ii, n. masc.*) A gallon.

***Coq.*** = Coque. (*coquo, -xi, -ctum, -ere, v. im, m.*) Boil.

***Cras*** (*adv.*) To-morrow.

***Cuj.*** = Cujus. (*gen. s. of qui, quæ, quod.*) Of which

***C.*** = Cum. (*prep. gov. abl. See Rule* ix). With.

***Cyath.*** = Cyathus. (*-us, -i, n. masc.*) A glass.

***C. Vinar.*** = Cyathus Vinarius. A wine-glass.

***Da*** = Da (*do, dedi, datum, dare, imp. m.,*) Give ;
***Det.*** Detur. (*pres. sub., 3rd p. s.*) Let it be given

***Decub.*** = Decubitus. (*-us, -a, -um, part.*) Lying down.

***De d.*** = De die (*-es, -ei, n. masc., ab. s. Rule* ix.) From day
***in d.*** in diem. (*Rule* viii.) to day.

***Dej.*** = Dejectiones. (*-onum, n. pl.*) Stools, or motion
***Alv.*** Alvi. (*-us, -i, n. f. gen. s.*) of the bowel.

***Dieb.*** = Diebus (*-es, -ei, n. ab. pl. Rule* ix.) Every
***Alt.*** Alternis. (*-us, -a, -um, adj. pl. ab. m. Rule* ii.) other day

***Dim.*** = Dimidius. (*-us, -a, -um, adj. no. s. masc.*) One-half.

***Div.*** = Divide. (*-do, -visi, -visum, -dere, im. m.*) Divide.

***Div.*** Dividatur (*-vido, -visi, -sum, -ere, v. 3rd per. s. prt. pas. sub.*) Let it be divided
***in*** =in (*prep., gov. partes. Rule* viii.*c.*) into
***p.*** partes (*n. ac. pl., gov. by in.*) parts
***Æq.*** Æquales (*adj., agreeing with partes.*) equal.

***Dolor.*** (*-oris, masc. no. s.*) Pain.

***Donec.*** (*conj.*) Until.

***D.*** = Dosis. (*dosis, n. f. no. s.*) A dose.

***Durant.*** = Durante (*-ans, -antis, part.*) While the pain
***Dolor.*** Dolore (*-oris, n. masc.*) lasts.

***Dum*** (*adv.*) Whilst.

***Duo*** (*duo, -æ, -o, adj.*) Two.

***Ejusd.*** = Ejusdem. (*idem, eadem, idem, gen. s. masc.*) Of the same.

***Elect.*** = Electuarium. (*-ium, -ii, neu. s.*) An electuary.

***Emesis*** (*-is, -is, n. f. s.*) Vomiting.

***F.*** = Fac. (*facio, feci, factum, facere, imp. m., 2nd p. s.*) Make.

***Frequenter*** (*adv.*) Frequently.

***Ft.*** = Fiat. (*fio, factus, fieri, pres. sub. 3rd s.*) Let it be made.

***Ft.*** = Fiant. ( ,, ,, ,, ,, ,, *pl.*) Let them be made

***Febris.*** (*-is, n. f. s.*) Fever.

***Ferv.*** = Fervens. (*-entis, adj.*) Hot.

***Garg.*** = Gargarisma. (*-matis, n. neu.*) A gargle.

***Gradatim.*** (*adv.*) By degrees.

***Gtt.*** = Gutta. (*-æ, n. f. s.*) A drop.

***Guttat.*** = Guttatim. (*adv.*) By drops.

***Haust.*** = Haustus. (*-us, n. masc.*) A draught.

***Hebdomas*** (*-domas, -adis, n. f.*) A week.

***Heri*** (*adv.*) Yesterday.

***H.*** = Hora. (*-æ, n. f.*) An hour.

***H. S. S.*** = Hora Somni Sumendum. To be taken at bed-hour.

***Idem*** (*Idem, eadem, idem, pron.*) The same.

***In d.*** = In-dies. (*adv.*) From day to day or daily.

***Injectio*** (*-onis, n. f.*) An injection.

***Lin.*** = Linimentum. (*-i, n. neu.*) A liniment.

***Lotio*** (*-onis, n. f.*) A lotion.

***Mag.*** = Magnus. (*-us, -a, -um, adj. no. s.*) Large.

***Mane.*** (*indecl. neu. n.*) In the morning.

***Mane Primo.*** (*adv.*) Very early in the morning.

***M.*** = Massa (*-æ, n. f.*) A mass.

***M. P.*** = Massa Pilularis (*-is, -e, adj.*) A pill mass.

***Medius*** (*-us, -a, -um, adj.*) Middle.

***Mensura*** (*-æ, n. f.*) By measure.

***M. or Min.*** = Minimum (*-i, n. neu.*) A minim.

***M.*** = Misce (*misceo, miscui, mistum, miscere, pres. imper.*) Mix.

***Mist.*** = Mistura (*-æ, n. f.*) A mixture.

***Mitte*** (*mitto, misi, missum, mittere, 2nd p. s. pres. imper.*) Send.

***Modicus*** (*-us, -a, -um.*) Middle-sized.

***More dict.*** = More dicto. (*more, mos, -ris, n. masc.; dicto, dico, -xi., -ctum, -ere, participle.*) In the manner directed.

***More sol.*** = More solito. (*solito, -avi, -are,.*) In the usual manner.

***Nisi*** (*conj.*) Unless.

***Nox*** (*noctis, n. f.*) Night.

***Om.*** = Omnis (*-is, -e. adj.*) All.

***Omn. Hor.*** = Omni Hora. (*-æ, n. f.*) Every hour.

***Omn. Quadr. Hor.*** = Omni Quadrante Horæ. (*quadrans, -tis, ab. f.*) Every quarter of an hour.

***Ope*** = Ops (*-is, n. f., ab. s. Rule* ix.(*a*).) By the aid of.

***Opus*** (*operis, n. neu.*) Need or occasion.

***Pars*** (*-tis, n. f.*) A part.

***P. æ.*** = Partes Æquales (*-is, -e, adj.*) Equal parts.

***Parvulus*** (*-a, -um, adj.*) Very little.

***Paul.*** = Paululus. (*-a, -um, adj.*) Little.

***Parvus*** (*-us, -a, -um, adj.*) Little.

***Pil.*** = Pilula (*-æ, n. f.*) A pill.

***Pocul.*** = Poculum (*-i, n. neu.*) A cup—a little cup.

***P. P. A.*** = Phiala prius agitata (*ablative absolute*). The bottle having been first shaken.

***Primus*** (*-us, -a, -um, adj.*) First.

***P. r. n.*** = Pro re nata. (*adv.*) Occasionally, or according to circumstances.

***Pulv.*** = Pulvis (*-veris, n. mas.*) A powder.

***Q. S.*** { = Quantum. (*adv.*) } As much as
Sufficiat (*sufficio, -feci, -fectum, -ere*) } is sufficient.

***Quaque Hora*** (*quisquis, abl. s.*) Each hour.

***Quartus*** (*-us, -a, -um, adj.*) Fourth.

***Quintus*** (*-us, -a, -um, adj.*) Fifth.

***Quor.*** = Quorum (*qui, quæ, quod, pron.*) Of which.

***Quater*** (*adv.*) Four times.

***Quibus*** (*qui, quæ, quod, rel. pron. ab. pl.*) From which.

***Quotidie*** (*adv.*) Daily.

***Q. Q.*** = Quaque *f*, or Quoque *masc.* (*quisque, quæque, quodque. abl. s. indef. prn.*) Each or every.

***R.*** = Recipe. (*recipio, recepi, receptum, recipere, im. m.*) Take thou.

***Rec.*** = Recens. (*-entis, adj.*) Fresh.

***Repet.*** = Repetatur. (*repeto, -ivi, -itum, -ere, sub. m. 3rd s.*) Let it be repeated
Repetantur. (*3rd pl.*) Let them be repeated

***S. A.*** = Secundum Artem (*secundum, prep.; ars, artis, n. f.*) According to art.

***S. N.*** = Secundum Naturam (*-a, -æ, n. f.*) According to nature.

***Secundus*** (*-us, -a, -um, adj.*) Second.

***Ss.*** = Semis (*-is, -issis, n. mas.*) A half.

***Sesquih.*** = Sesquihora (*sesquihora, -æ, n. f.*) An hour and a half.

***Sextus*** (*-us, -a, -um, adj.*) Sixth.

***Si.*** (*conj.*) If.

***Simul.*** (*adv.*) Together.

***Sine.*** (*prep.*) Without.

***Sing.*** = Singulorum (*singuli, -æ, -a.*) Of each.

***Si op. sit*** = Si opus sit. If necessary.

***Sit*** (*sum, fui, esse, p. sub.*) Let it be.

***Solve*** (*solvo, solvi, solutum, solvere.*) Dissolve.

***Somnus*** (*-i, n. mas.*) Sleep.

***Stat.*** = Statim. (*adv.*) Immediately.

***Sum.*** = Sume (*sumo, sumpsi, sumptum, sumere, im. m.*) Take.

***Sæpe*** (*adv.*) Often.

***Semiuncia*** (*-æ, n. f.*) A half-ounce.

***Sig.*** = Signa. (*signo, -avi, -atum, -are, im. m.*) Mark thou.

***Sum.*** = Sumendus. (*-a, -um, gerundive.*) To be taken.

***S. S.*** = Statim Sumendum. To be taken immediately.

***St.*** = Sumat. (*sumo, sumpsi, sumptum, sumere, pr. sub.*) Let him take.

***Talis*** (*talis, talis, tale, adj.*) Such.

***Tertius*** (*-us, -a, -um, adj.*) Third.

***Trit.*** = Tritura (*trituro, triturare, im. m.*) Triturate.

***Tere*** (*tero, trivi, tritum, terere, im. m.*) Rub.

***Tussis*** (*-is, n. f.*) A cough.

***Una.*** (*adv.*) Together.

***Unus*** (*-a, -um, adj.*) One.

***Uncia*** (*-æ, n. f.*) An ounce.

***Ut Dict.*** = Ut Dictum. As directed.

***Utend.*** = Utendum. (*-us, -a, -um, gerundive.*) To be used.

***Vac. Ven.*** = Vacuo Ventriculo (*adj. & n., ab. sing. Rule* ix.(*a.*) On an empty stomach.

***Vesp.*** = Vesper. (*-eris, n. mas.*) The evening.

***Vel*** (*conj.*) Or.

## PRESCRIPTION READING.*

THE autograph prescriptions on the following left-hand pages, with their translation into unabbreviated Latin and English on the right-hand pages, will give the student a better idea of how he should write a recipe than the perusal of a volume of printed formulæ.

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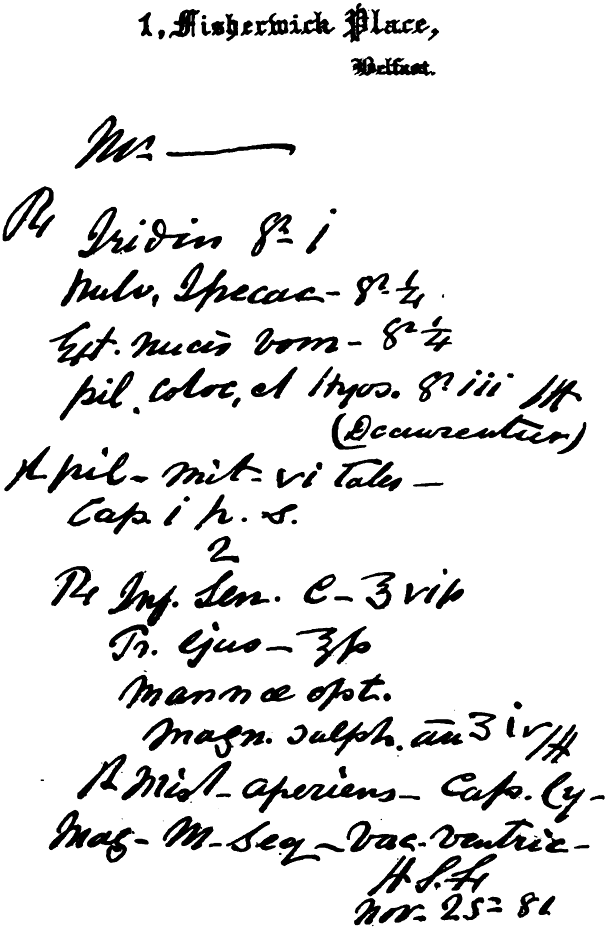
* Those who wish to study the *difficulties* of prescription reading should consult Mr. Proctor's book on Pharmacy, which contains a valuable selection of autograph prescriptions.



1, Fisherwick Place,
Belfast.

Mr ——

℞ Iridin gr. i
Pulv. Ipecac – gr. ¼
Ext. nucis vom – gr ¼
pil. coloc. et hyos. gr. iii M
(Deaurentur)
ft pil – mit – vi tales –
Cap. i h. s.

2

℞ Inf. Sen. C – ℥ viss
Tr. ejus – ℥ss
Mannae opt.
Magn. sulph. āā ℥ iv M
ft Mist – aperiens – Cap. Cy –
Mag – M – Seq – vac. ventric –

H.S.H.
Nov. 25 = 81

*Mr.* ———

*Recipe*

*Iridin granum unum.*
*Pulveris Ipecacuanhæ quadrantem grani.*
*Extracti Nucis Vomicæ quadrantem grani.*
*Pilulæ Colocynthidis et Hyoscyami grana tria.*
*misce.*

*Fiat pilula, mitte tales sex (deaurentur). Capiat unam horâ somni.*

*Recipe*

*Infusi Sennæ Compositæ uncias sex cum semisse.*
*Tincturæ Ejusdem semiunciam.*
*Mannæ Optimæ*
*Magnesiæ Sulphatis ana drachmas quatuor.*
*misce.*

*Fiat mistura aperiens. Capiat cyathum magnum mane sequente vacuo ventriculo.*

Nov. 25, '81.

*H.S.F.*

Take

1 grain of Iridin.
¼ grain of Ipecacuanha.
¼ grain of Extract of Nux Vomica.
3 grains of Pill of Colocynth and Hyoscyamus.
mix.

Make a pill. Send six such (pills). Let them be gilded. Take one at bed-hour.

Take

6½ ounces of Compound Infusion of Senna.
½ ounce of the Tincture of the same.
4 drams of best Manna.
4 drams of Sulphate of Magnesia. mix.

Make an aperient mixture. Take a large glassful the following morning on an empty stomach.

Nov. 25th, '81.

*H.S.F.*

R. Acid Sulph Dil. ʒß
Chin Sulph. gr xii
Liq. Morph. Hydrochlor. ʒj
Aq. Cinn. ad ℥vi
M.

Sign. ʒß in cyath. vin. dul.
ag. quart. quaqu. hor.

---

R. Lin. Chlorofor. ℥ii
Sign. applic. op. lint. et-
ter ol. mam. noctique.

Fleming

Nov 26th 1881.

*Recipe*

*Acidi Sulphurici Diluti semiunciam.*
*Quiniæ Sulphatis grana duodecim.*
*Liquoris Morphiæ Hydrochloratis drachmam unam.*
*Aquæ Cinnamomi ad uncias sex.*
*misce.*

***Signa**, semiunciam ex cyathis vinariis duobus aquæ quarta quaque hora.*

*Recipe*

*Linimenti Chloroformi uncias quatuor.*

*Signa*, "*Applicandum ope lintei et serici oleati mane nocteque.*"

*J. Cuming.*

Nov. 26th, '81.

Take

½ ounce of Dilute Sulphuric Acid.
12 grains of Sulphate of Quinia.
1 dram of Solution of Hydrochlorate of Morphia.
Cinnamon Water to 6 ounces.
mix.

Mark it, "Half an ounce (one tablespoonful) in two wineglassfuls of water every fourth hour."

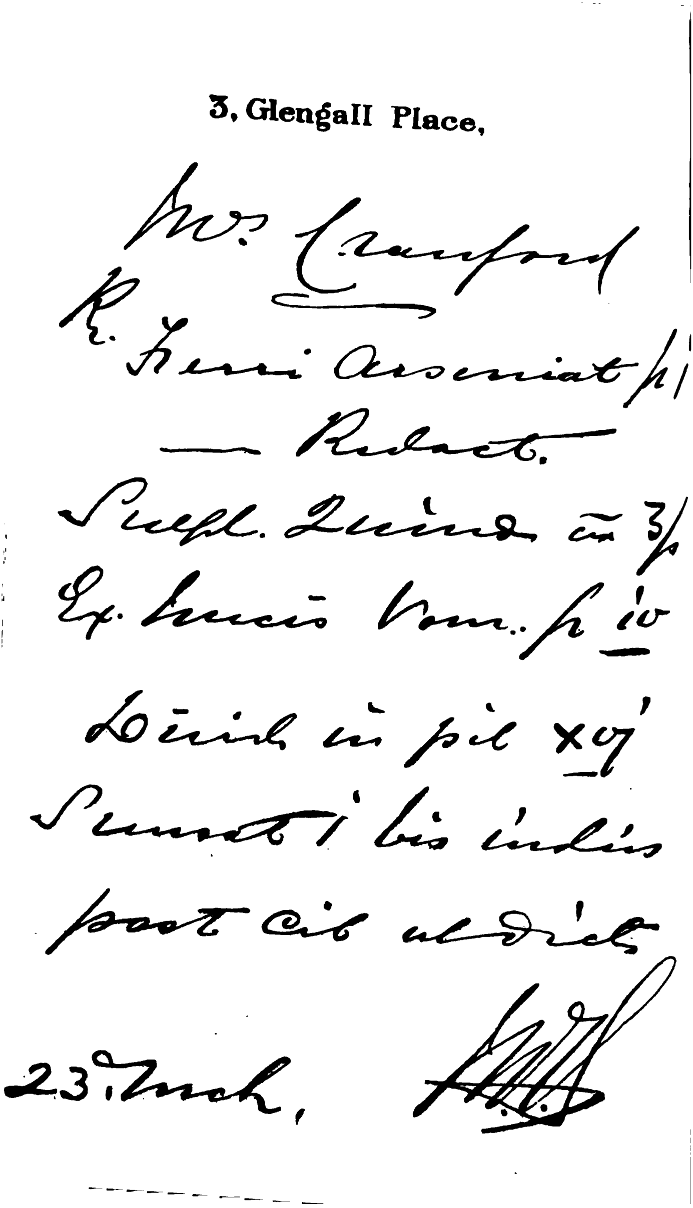
Take

4 ounces of Liniment of Chloroform.

Mark it, "To be applied by the aid of lint and oiled silk morning and night."

*J. Cuming.*

Nov. 26, '81.



3, Glengall Place,

Mrs Crawford

R. Ferri Arseniat gr i

— Redact.

Sulph. Quininæ āā ʒss

Ex. Nucis Vom. gr iv

Divid in pil xij

Sumat i bis indies

post cib ut dict

23 Mch,

*Mrs. Crawford.*

*Recipe*

*Ferri Arseniatis granum unum.*

*Ferri Redacti*

*Quiniæ Sulphatis ana semidrachmam.*

*Extracti Nucis Vomicæ grana quatuor.*

*misce.*

*Divide in pilulas sedecim. Sumat unam bis indies post cibos ut dictum.*

*J.W.T.S.*

23rd March.

Take

1 grain of Arseniate of Iron.

Reduced Iron

Sulphate of Quinia, of each half a dram.

4 grs. of Extract of Nux Vomica.

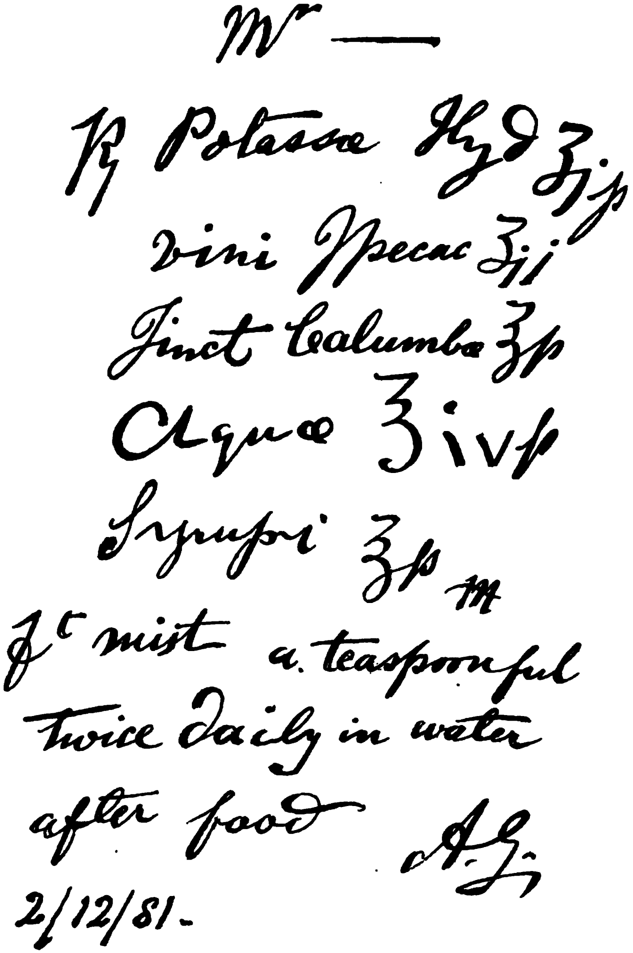
mix.

Divide into sixteen pills.

Take one twice a day after meals as directed.

*J.W.T.S.*

23rd March.



Mr —

℞ Potassæ Hyd ʒiß

Vini Ipecac ʒij

Tinct Calumbæ ʒß

Aquæ ℥ivß

Syrupi ʒß M

Ft mist a teaspoonful twice daily in water after food

A. G.

2/12/81.

*Mr.*

*Recipe*

*Potassæ Hydriodatis drachmam unam cum semisse.*

*Vini Ipecacuanhæ drachmas duas.*

*Tincturæ Calumbæ semiunciam.*

*Aquæ uncias quatuor cum semisse.*

*Syrupi semiunciam.* *misce.*

*Fiat mistura.*

*A.G.*

2 / 12 / '81.

Take

1½ drams of Hydriodate of Potash.

(1½ drams of Iodide of Potassium.)

2 drams of Ipecacuanha Wine.

½ ounce of Tincture of Calumba.

4½ ounces of Water.

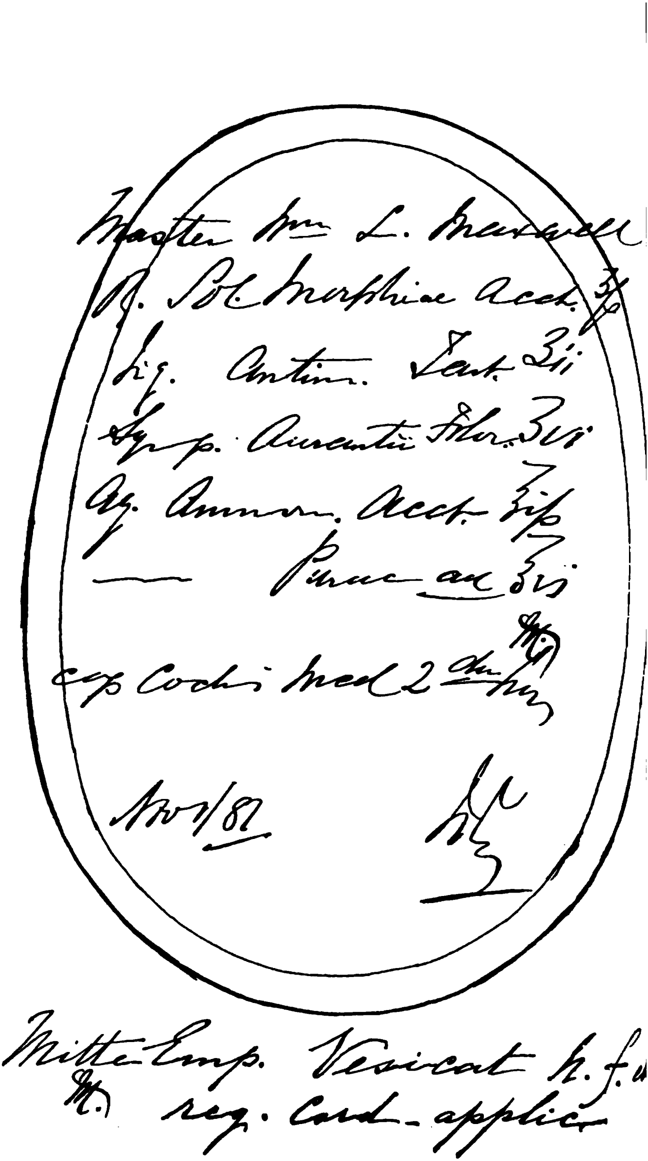
½ ounce of Syrup. mi

Make a mixture.

A teaspoonful twice daily in water after food.

*A.G.*

2 / 12 / '81.



Master Wm L. Maxwell

℞. Sol. Morphiae Acet. ʒß

Liq. Antim. Tart. ʒii

Syrup. Aurantii Flor. ʒiii

Aq. Ammon. Acet. ℥iß

—— Purae ad ℥ii

M.

Cap. Coch. Med. 2da hor.

Nov 1/81

Mitte Emp. Vesicat. h. f. a

M. reg. Card. applic.

*Master W. L. Maxwell.*

*Recipe*

*Solutionis Morphiæ Acetatis semidrachmam.*

*Liquoris Antimonii Tartarati drachmas duas.*

*Syrupi Aurantii Floris drachmas sex.*

*Aquæ Ammoniæ Acetatis unciam unam cum semisse.*

*Aquæ Puræ ad* ℥vj.

*misce.*

*Capiat cochleare unum medium secundis horis.*

*T.K.W.*

*Mitte Emplastrum Vesicatorium hujus formæ et magnitudinis regione cordis applicandum.*

Nov. 1st, 1881.

Take

½ dram of Solution of Acetate of Morphia.

2 drams of Solution of Tartarated Antimony.

6 drams of Syrup of Orange Flower.

1½ ounces of Water of Acetate of Ammonia.

Pure Water to 6 ounces.

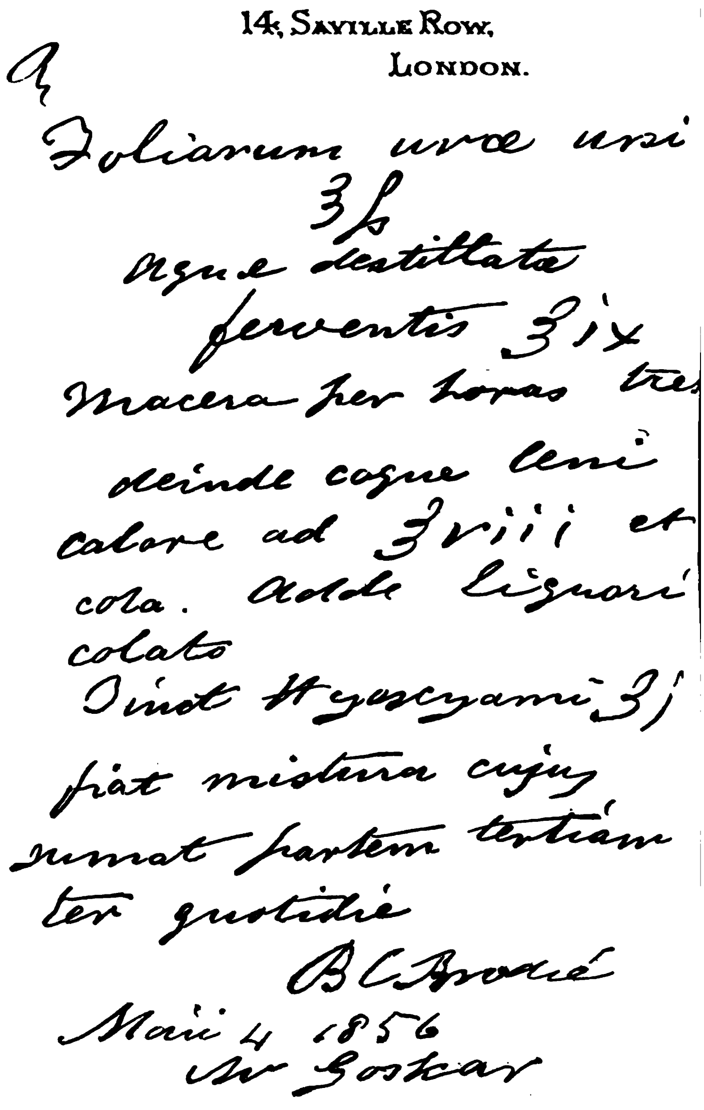
mix.

Take a dessertspoonful every second hour.

*T.K.W.*

Nov. 1st 1881.

Send a blister of this shape and size, to be applied over the region of the heart.



14, Saville Row,
London.

℞

Foliarum uvæ ursi
℥ss
Aquæ destillatæ
ferventis ℥ix
Macera per horas tres
deinde coque leni
calore ad ℥viii et
cola. Adde liquori
colato
Tinct Hyoscyami ʒj
fiat mistura cujus
sumat partem tertiam
ter quotidie

B C Brodie

Maii 4 1856
Mr Goskar

Take of

Bearberry Leaves,

Half-an-ounce.

Hot Distilled Water,

Nine ounces.

Macerate for three hours.

Then boil to eight ounces with a gentle heat and strain.

Add to the strained liquid,

One dram

of Tincture of Henbane.

Make a mixture,

Of which let a third part be taken three times a day.

(Signed),

*B. C. Brodie.*

4th May, 1856.

*Mr. Goskar.*

℞ Euonymin gr ii
Ms. p. Hyd. gr ii
— . — Col. C. gr iii ft
Mitte xii — cpt unam 2c
q.q. nocte h. s —

---

℞ Sul. Magnesiæ ʒii
— Quininæ ʒi
Syrupi Aurant. ʒii
Tincturæ Lemon C. ʒii
Aquæ Pur: ad ℥xii
Tinct: Digit: ʒii ft —

Cpt ʒss (p.p.a) om: primo m
meridieque - hora c somni: aut
alium —

---

℞ Spiritus Camphorati: ʒii
Olei Camphorati: ad ʒv
Tinct — Thebaica ʒi ftr
ʒss (p.p.a) bene infricandam infra gen
sinistrum om. nocte — 28/6/81 — A.K.

*Recipe*

*Euonymin grana duo.*

*Massæ Pilulæ Hydrargyri grana duo.*

*Massæ Pilulæ Colocynthidis Compositæ grana duo.*

*misce.*

*Mitte octo—capiat unam secunda quaque nocte hora somni.*

*Recipe*

*Sulphatis Magnesiæ uncias duas.*

*Sulphatis Quiniæ drachmam unam.*

*Syrupi Aurantii uncias duas.*

*Tincturæ Sennæ Compositæ uncias duas.*

*Aquæ Puræ ad uncias duodecim.*

*Tincturæ Digitalis drachmas duas.*

*misce.*

*Capiat semiunciam (phiala prius agitata) omni primo mane meridieque, hora cum semisse ante cibum.*

*Recipe*

*Spiritus Camphorati uncias duas.*

*Olei Camphorati ad uncias sex.*

*Tincturæ Thebaicæ unciam unam.*

*misce.*

*Semiunciam (phiala prius agitata) bene infricandam infra genu sinistrum omni nocte.*

*A.K.Y.*

28 / 6 '81.

[OVER

Take

2 grains of Euonymin.

2 grains of the pill mass of Mercury.

2 grains of the Compound pill mass of Colocynth.

mix.

Send 8 pills. Take one every second night at bed-hour.

Take

2 ounces of Sulphate of Magnesia.

1 dram of Sulphate of Quinia.

2 ounces of Syrup of Orange Peel.

2 ounces of Compound Tincture of Senna.

Pure Water to 12 ounces.

2 drams of Tincture of Digitalis.

mix.

Take ½ oz. (the bottle having been first shaken) the first thing every morning, and every middle of the day one hour and a half before food.

Take

2 ounces of Camphorated Spirit.

Camphorated Oil to 6 ounces.

1 ounce of Tincture of Thebaica.

(1 oz. Laudanum.)

mix.

½ oz. (the bottle having been first shaken) to be well rubbed in beneath the left knee every night.

*A.K.Y.*

28 / 6 / '81.

# PART V.

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## PHARMACOPŒIAL REACTIONS AND TESTS.

**Acetum ($HC_2H_3O_2$).**

$$C_5H_5HO + O_2 = HC_2H_3O_2 + H_2O$$

TESTS—(*a*)—If 10 minims of solution of Chloride of Barium be added to a fluid ounce of vinegar, and the ppt., if any, be separated by filtration, a further addition of the test will give no ppt. (Absence of more than $\frac{1}{1000}$ part of Sulphuric Acid—$H_2SO_4$).

**Acid. Aceticum ($HC_2H_3O_2$).**

$$NaC_2H_3O_2 + H_2SO_4 = NaHSO_4 + HC_2H_3O_2$$

TESTS—(*a*)—A colourless liquid, having a strong acid reaction and pungent smell.

(*b*)—It leaves no residue when evaporated (absence of mineral matter), and gives no ppt. with Sulphuretted Hydrogen ($H_2S$), (absence of Lead and Copper), or with Chloride of Barium ($BaCl_2$), (absence of Sulphuric Acid —$H_2SO_4$), or with Nitrate of Silver (absence of Hydrochloric Acid—HCl).

**Acid. Acet. Glac. ($HC_2H_3O_2$).**

$$Ca(C_2H_3O_2)_2 + 2HCl = CaCl_2 + 2HC_2H_3O_2$$

## Acid. Arseniosum ($As_2O_3$).

TESTS—

(*a*)—Occurs as a heavy, white powder; when slowly sublimed in a narrow glass tube it forms minute, brilliant, octahedral crystals, with triangular facets.

(*b*)—Is sparingly soluble in water, and its solution gives a *dark yellow ppt.* with Sulphuretted Hydrogen, acidulated.

(*c*)—Gives a *canary yellow ppt.* with Ammonio—Nitrate of Silver.

(*d*)—Gives a *grass green ppt.* with Ammonio—Sulphate of Copper.

## Acid. Benzoicum ($HC_7H_5O_2$).

$$\begin{cases} 2HC_7H_5O_2 + Ca2HO = Ca2C_7H_5O_2 + 2H_2O \\ Ca2C_7H_5O_2 + 2HCl = 2HC_7H_5O_2 + CaCl_2 \end{cases}$$ (Attfield)

TESTS—

(*a*)—In light, feathery crystalline plates and needles, nearly colourless, having an agreeable aromatic smell. Sparingly soluble in water, freely soluble in rectified spirit, and in the solutions of the caustic alkalies, and of lime.

## Acid. Carbolicum ($HC_6H_5O$).

$$\begin{cases} HC_6H_5O + KHO = KC_6H_5O + H_2O \\ KC_6H_5O + HCl = HC_6H_5O + KCl \end{cases}$$

TESTS—

(*a*)—Melts at 95° F.

(*b*)—Boiling point 370° F.

(*c*)—Does not affect the plane of polarisation of a ray of polarised light.

## Acid. Citricum ($H_3C_6H_5O_7.H_2O$).

$$\begin{cases} 2H_3C_6H_5O_7 + 3CaCO_3 = Ca_32C_6H_5O_7 + 3H_2O + 3CO_2 \\ Ca_32C_6H_5O_7 + 3H_2SO_4 = 2H_3C_6H_5O_7 + 3CaSO_4 \end{cases}$$

TESTS—

(*a*)—Gives no ppt. when added in excess to a solution of Acetate of Potash (absence of Tartaric Acid—$H_2C_4H_4O_6$).

(*b*)—If sparingly added to cold lime water does not render it turbid (absence of Oxalic Acid—$H_2C_2O_4$).

TESTS—
(c)—Gives no ppt. when added in excess to a solution of Chloride of Barium (absence of Sulphuric Acid—$H_2SO_4$).
(d)—The crystals leave no ash when burned with free access of air (absence of mineral matter).
(e—The aqueous solution is not darkened by Sulphuretted Hydrogen ($H_2S$), (absence of Copper or Lead).

### Acid. Gallicum ($H_3C_7H_3O_5.H_2O$).

$$C_{27}H_{22}O_{17} + 4H_2O = 3H_3C_7H_3O_5 + C_6H_{12}O_6$$

TESTS—
(a)—Crystalline, in needle-shaped prisms, of a *pale yellow or fawn colour.*
(b)—Soluble in 100 parts of cold water, and in 3 parts of boiling water.
(c)—Its solution in water gives no ppt. with solution of Isinglass (absence of Tannic Acid—$C_{27}H_{22}O_{17}$).
(d)—Gives a *bluish black ppt.* with a persalt of Iron.

### Acid. Hydrochloricum (HCl).

$$NaCl + H_2SO_4 = HCl + NaHSO_4$$

TESTS—
(a)—A nearly colourless and strongly acid liquid, giving out white, pungent vapours.
(b)—Gives a *curdy white ppt.* with Nitrate of Silver, soluble in excess of solution of Ammonia, insoluble in Nitric Acid.
(c)—Gives out white fumes on holding over it a glass rod dipped in solution of Ammonia.
(d)—When diluted with four times its volume of distilled water it gives no ppt. with Solution of Chloride of Barium ($BaCl_2$), (absence of Sulphuric Acid—$H_2SO_4$), or with Sulphuretted Hydrogen ($H_2S$), and does not tarnish bright copper foil when boiled with it (absence of Arsenic).

### Acid. Hydrocyanicum Dilutum (HCy).

$$2K_4FeCy_6 + 6H_2SO_4 = 6HCy + 6KHSO_4 + FeK_2FeCy_6 \text{ (Everitt's salt)}.$$

## Acid. Hydrocyanicum Dilutum (HCy).—*Continued.*

TESTS—

(*a*)—A colourless liquid with a peach-blossom smell: treated with a small quantity of a mixed solution of Sulphate ($FeSO_4$), and Persulphate of Iron ($Fe_2 3SO_4$), afterwards with Solution of Potash, and finally acidulated with Hydrochloric Acid, it forms a *deep blue ppt.* = Prussian Blue ($Fe_7Cy_{18}$) = *Iron Test.*

(*b*)—It gives a *white ppt.* with Nitrate of Silver ($AgNO_3$), entirely soluble in boiling strong Nitric Acid ($HNO_3$) = *Silver Test.*

(*c*)—It gives a *blood red ppt.* on the addition of a solution of Sulphide of Ammonium ($NH_4HS$) and Ammonia ($NH_4HO$); heat to expel the excess of Ammonia; acidify with Hydrochloric Acid (HCl), and add a drop of solution of a ferric salt = *Sulphur Test.*

(*d*)—It gives no ppt. with Chloride of Barium ($BaCl_2$) (absence of Sulphuric Acid—$H_2SO_4$), but with Nitrate of Silver ($AgNO_3$) it gives a white ppt., entirely soluble in boiling Nitric Acid (absence of Hydrochloric Acid —HCl).

## Acid. Nitricum ($HNO_3$).

$$KNO_3 + H_2SO_4 = HNO_3 + KHSO_4$$

TESTS—

(*a*)—A colourless, strongly acid liquid, which, when exposed to the air, gives out an acrid, corrosive vapour.

(*b*)—Gives dense *red* vapours when poured over copper filings.

(*c*)—If introduced into a solution of Sulphate of Iron ($FeSO_4$) and Sulphuric Acid ($H_2SO_4$) a *dark purple* or *brown colour* is formed.

(*d*)—Gives an *orange colour* with a fragment of Morphia.

## Acid. Nitro-Hydrochloricum Dilutum ($N_2O_2Cl_4$).

$$\left\{\begin{array}{l} 2HNO_3 + 6HCl = N_2O_2Cl_4 + 4H_2O + Cl_2 \\ HNO_3 + 3HCl = NOCl + 2H_2O + Cl_2 \end{array}\right\}$$

## Acid. Phosphoricum Dilutum ($H_3PO_4$).

$$12P + 20HNO_3 + 8H_2O = 12H_3PO_4 + 20NO$$

TESTS—

(*a*)—A colourless, strongly acid liquid with a sour taste.

(*b*)—Gives a canary yellow ppt. with the Ammonio—Nitrate of Silver, soluble in Ammonia ($NH_4HO$) and diluted Nitric Acid ($HNO_3$).

(*c*)—Gives a *yellow ppt.* with Molybdate of Ammonium acidified with Nitric acid ($HNO_3$).

(*d*)—It is not pptd. by Sulphuretted Hydrogen ($H_2S$) (absence of Lead or Platinum), Chloride of Barium ($BaCl_2$), (absence of Sulphuric Acid — $H_2SO_4$), Nitrate of Silver ($AgNO_3$) acidulated with Nitric Acid (absence of Hydrochloric Acid—$HCl$); or by the solution of Albumen (absence of Metaphosphoric Acid—$HPO_3$). When mixed with an equal volume of pure Sulphuric Acid ($H_2SO_4$), and then added to solution of Sulphate of Iron ($FeSO_4$), it does not give to it a *dark colour* (absence of Nitric Acid—($HNO_3$); mixed with an equal volume of Perchloride of Mercury ($HgCl_2$), and heated, no ppt. is formed (absence of Phosphorous Acid—$H_2PHO_3$).

## Acid. Sulphuricum ($H_2SO_4$).

$$\left\{\begin{array}{l} S_2 + 2O_2 = 2SO_2 \\ SO_2 + H_2O = H_2SO_3 \\ H_2SO_3 + NO_2 = H_2SO_4 + NO \\ (2NO + O_2 = 2NO_2) \end{array}\right.$$

TESTS—

(*a*)—A colourless, oily-looking liquid, intensely acid and corrosive; specific gravity, 1·843.

(*b*)—It gives an *insoluble white ppt.* on adding to it a solution of Chloride of Barium ($BaCl_2$).

(*c*)—It gives out much heat and contracts, on the addition of water.

(*d*)—It chars organic matter.

(*e*)—Evaporated in a Platinum dish, it leaves little or no residue (absence of mineral matter).

Tests—

(*f*)—When a solution of Sulphate of Iron ($FeSO_4$) is carefully poured over its surface, there is ***no purple*** colour where the liquids unite (absence of Nitric Acid, $HNO_3$).

(*g*)—Diluted with six times its volume of distilled water, it gives no ppt. with Sulphuretted Hydrogen (absence of Arsenic or Lead).

## Acid. Sulphurosum ($H_2SO_3$).

$$4H_2SO_4 + C_2 = 4H_2SO_3 + 2CO_2$$

Tests—

(*a*)—A colourless liquid with a pungent sulphurous smell.

(*b*)—On generating hydrogen gas in a solution of Sulphurous Acid ($H_2SO_3$) by the action of Hydrochloric Acid (HCl) on zinc, Sulphuretted Hydrogen is formed, recognised by its putrid smell, and by its giving a black ppt. with solution of Acetate of Lead (Pb $(C_2H_3O_2)_2$.

(*c*)—It gives no ppt., or but a *very slight one*, with Chloride of Barium ($BaCl_2$), but a ***copious one*** if a Solution of Chlorine be also added (absence of Sulphuric Acid—$H_2SO_4$).

## Acidum Tannicum ($C_{27}H_{22}O_{17}$).

Tests—

(*a*)—In pale yellow, vesicular masses or thin glistening scales, with a strongly astringent taste, and an acid reaction.

(*b*)—Readily soluble in water and rectified spirit; very sparingly soluble in ether.

(*c*)—The aqueous solution ppts. solution of gelatine *yellowish-white* colour.

(*d*)—And ppts. the persalts of Iron a ***bluish-black*** colour.

(*e*)—It leaves no residue when burned with free access of air (absence of mineral matter).

## Acid. Tartaricum ($H_2C_4H_4O_6$).

$$\begin{cases} 2KHC_4H_4O_6 + CaCO_3 = CaC_4H_4O_6 + K_2C_4H_4O_6 \\ \quad + H_2O + CO_2 \\ K_2C_4H_4O_6 + CaCl_2 = CaC_4H_4O_6 + 2KCl \\ 2CaC_4H_4O_6 + 2H_2SO_4 = 2H_2C_4H_4O_6 + 2CaSO_4 \end{cases}$$

**Acid. Tartaricum ($H_2C_4H_4O_6$).**—*Continued.*

TESTS—

- (*a*)—In colourless, oblique, rhombic crystals. It has a strongly acid taste, and is readily soluble in water and rectified spirit.
- (*b*)—To a solution of Tartaric Acid ($H_2C_4H_4O_6$) made neutral by solution of Soda ($NaHO$), add solution of Chloride of Calcium ($CaCl_2$); a white ppt.—Tartrate of Calcium ($CaC_4H_4O_6$)—falls. Collect the ppt. on a filter, wash, place in a test-tube, and add solution of Potash ($KHO$); on stirring the mixture the ppt. dissolves, showing the absence of Citrate of Calcium ($Ca_32C_6H_5O_7$).
- (*c*)—To a solution of a Tartrate, acidified with Acetic Acid ($HC_2H_3O_2$), add Acetate of Potassium ($KC_2H_3O_2$), and well stir the mixture; a crystalline ppt. of Acid Tartrate of Potassium ($KHC_4H_4O_6$) slowly separates.
- (*d*)—An aqueous solution of the acid is not affected by Sulphuretted Hydrogen ($H_2S$), (absence of Lead), and gives no ppt. with the Solution of Sulphate of Lime ($CaSO_4$), (absence of Oxalic Acid—$H_2C_2O_4$), or of Oxalate of Ammonia ($(NH_4)_2C_2O_4$), (absence of Calcium Tartrate—$CaC_4H_4O_6$ or Sulphate—$CaSO_4$).
- (*e*)—It leaves no residue, or only a mere trace, when burned with free access of air (absence of mineral matter).

**Æther ($C_4H_{10}O$).**

$$\begin{cases} C_2H_5HO + H_2SO_4 = C_2H_5HSO_4 + H_2O \\ C_2H_5HO + C_2H_5HSO_4 = C_4H_{10}O + H_2SO_4 \end{cases}$$

TESTS—

- (*a*)—A colourless, very volatile and inflammable liquid, giving out a strong characteristic smell.
- (*b*)—Boiling point below 105° F. (absence of alcohol).
- (*c*)——Specific gravity ·735 (absence of alcohol).

**Æther Aceticus ($C_2H_5C_2H_3O_2$).**

$$C_2H_5HO + NaC_2H_3O_2 + H_2SO_4 = C_2H_5C_2H_3O_2 + NaHSO_4 + H_2O$$

Tests—
(*a*)—A colourless liquid with an agreeable ethereal smell.
(*b*)—Boiling point 166° F. (absence of water and alcohol).
(*c*)—Specific gravity ·910 (absence of water and alcohol).

**Æther. Nitrosi Spiritus ($C_2H_5NO_2$).**

$$C_2H_5HO + HNO_3 + H_2SO_4 + Cu = C_2H_5NO_2 + 2H_2O + CuSO_4$$

Tests—
(*a*)—Transparent and nearly colourless mobile inflammable, having a peculiar apple-like smell, and sweetish, cooling, sharp taste.
(*b*)—Specific gravity ·845.
(*c*)—It effervesces feebly or not at all when shaken with a little Bicarbonate of Soda ($NaHCO_3$), (absence of free acid).
(*d*)—When shaken with solution of Sulphate of Iron ($FeSO_4$) and a few drops of Sulphuric Acid ($H_2SO_4$) it becomes a deep olive brown or black colour.

**Alcohol ($C_2H_5HO$).**

$$C_6H_{12}O_6 + \text{Fermentation} = 2C_2H_5HO + 2CO_2$$

Tests—
(*a*)—Specific gravity ·795.
(*b*)—Does not reduce Nitrate of Silver ($AgNO_3$) to the metallic state (absence of Amylic Alcohol ($C_5H_{11}HO$) and Aldehyd ($C_2H_4O$).
(*c*)—Should not render Anhydrous Sulphate of Copper ($CuSO_4$) *blue* (absence of water.)
(*d*)—Should not become opaque on the addition of water (absence of resin or oil).

**Alcohol Amylicum ($C_5H_{11}HO$).**

$C_5H_{11}HO$ is obtained during the distillation of Alcohol from sugar derived from starch (Amylum), hence its name Amylic Alcohol.

Tests—
(*a*)—Boiling point 270°F. (absence of other spirituous matter).
(*b*)—Specific gravity ·818 (absence of other spirituous matter).

**Alumen $(NH_4Al\ 2(SO_4)12H_2O)$.**

$$Al_2O_3 + 2NH_3 + 4K_2SO_4 + 5H_2O = (NH_4Al2SO_4)_2 + 8KHO$$

TESTS—

- (*a*)—In colourless, transparent crystalline masses, having an acid, sweetish, astringent taste.
- (*b*)—Its aqueous solution gives with Caustic Potash (KHO) or Soda (NaHO) a *white ppt.*, soluble in an excess of the reagent, and the mixture evolves Ammonia, especially when heated.
- (*c*)—The aqueous solution does not acquire a blue colour from the addition of yellow ($K_4FeCy_6$) or red Prussiate of Potash ($K_3FeCy_6$) (absence of Iron Sulphate—$FeSO_4$).
- (*d*)—Heated on charcoal in the blow-pipe flame, then moistened with Chloride of Cobalt ($CoCl_2$), and re-heated, an infusible *blue* mass is obtained.

**Ammoniæ Fortior Liquor $(NH_4HO)$.** Contains 32·5 per cent. Ammoniacal Gas ($NH_3$) in solution.

$$2NH_4Cl + Ca2HO = 2NH_4HO + CaCl_2$$

TESTS—

- (*a*)—A colourless liquid with a pungent smell. Specific gravity ·891.
- (*b*)—Changes red litmus paper to blue. The red colour is restored by heat being applied to the paper.
- (*c*)—Gives off dense *white* fumes when a glass rod moistened with strong Hydrochloric Acid (HCl) is held over it.
- (*d*)—When diluted with four times its volume of distilled water it does not give precipitates with Solution of Lime (Ca2HO), (absence of Carbonate of Ammonium—$N_4H_{16}C_3O_8$), Oxalate of Ammonium $(NH_4)_2C_2O_4$ (absence of Calcium Salts), Sulphide of Ammonium ($NH_4HS$), (absence of Iron and Lead), or Ammonio-Sulphate of Copper (absence of Sulphur Salts), and when treated with an excess of Nitric Acid ($HNO_3$) *is not* rendered turbid by Nitrate of Silver ($AgNO_3$) (absence of Chloride of Ammonium—$NH_4Cl$) or by Chloride of Barium ($BaCl_2$), (absence of Sulphate of Ammonium—$NH_4)_2SO_4$).

**Ammoniæ Liquor ($NH_4HO$).** Contains 10 per cent. Ammoniacal Gas ($NH_3$).

$$NH_3 + H_2O = NH_4HO$$

**Tests**—
- (*a*)—Specific gravity ·959.
- (*b*), (*c*)—Same as for Liquor Ammoniæ Fortior.

**Ammoniæ Acetatis Liquor ($NH_4C_2H_3O_2$).**

$$\underset{\text{Acid Carbonate and Carbamate of Ammonium}}{(NH_4HCO_3)_2NH_4NH_2CO_2} + 4HC_2H_3O_2 = 4NH_4C_2H_3O_2 + 2H_2O + 3CO_2$$

**Ammoniæ Benzoas ($NH_4C_7H_5O_2$).**

$$HC_7H_5O_2 + NH_4HO = NH_4C_7H_5O_2 + H_2O$$

**Tests**—
- (*a*)—In colourless laminar crystals, soluble in water and alcohol.
- (*b*)—It gives a bulky yellowish ppt. with Persalts of Iron.
- (*c*)—When heated, it sublimes without any residue (shows absence of fixed salts).

**Ammoniæ Carbonas ($N_4H_{16}C_3O_8$).**

"This salt, the empirical formula of which is $N_4H_{16}C_3O_8$ is probably a mixture of two molecules of Acid Carbonate of Ammonium ($2NH_4HCO_3$), and one of a salt called Carbamate of Ammonium ($NH_4NH_2CO_2$) = $N_4H_{16}C_3O_8$."—*Attfield.*

**Tests**—
- (*a*)—In translucent crystalline masses, with a strong ammoniacal smell and alkaline reaction. Soluble in water, less soluble in spirit.
- (*b*)—Volatilises entirely when heated (absence of fixed salts).
- (*c*)—If diluted Nitric Acid ($HNO_3$) be added to it in slight excess, and the solution boiled, it will give *no precipitate* with Chloride of Barium ($BaCl_2$), (absence of Sulphate of Ammonium—$(NH_4)_2SO_4$, or Nitrate of Silver ($AgNO_3$), absence of Chloride of Ammonium ($NH_4Cl$).

**Ammoniæ Citratis Liquor ($(NH_4)_3C_6H_5O_7$).**

$$H_3C_6H_5O_7 + 3NH_4HO = (NH_4)_3C_6H_5O_7 + 3H_2O$$

## Ammoniæ Nitras ($NH_4NO_3$).

$$NH_4HO + HNO_3 = NH_4NO_3 + H_2O$$

TESTS—
- (*a*)—A white deliquescent salt, in confused crystalline masses, having a bitter acrid taste.
- (*b*)—A solution of 1 part in 8 parts of distilled water gives no ppt., with solution of Nitrate of Silver ($AgNO_3$), (absence of Chloride of Ammonium — $NH_4Cl$), or with solution of Chloride of Barium ($BaCl_2$), (absence of Sulphate of Ammonium—$NH_4)_2SO_4$).

## Ammoniæ Phosphas ($(NH_4)_2HPO_4$).

$$H_3PO_4 + 2NH_4HO = (NH_4)_2HPO_4 + 2H_2O$$

TESTS—
- (*a*)—Occurs in transparent colourless prisms; soluble in water, insoluble in rectified spirit.
- (*b*)—When heated with Caustic Potash ($KHO$) Ammonia ($NH_4HO$) is evolved.
- (*c*)—The aqueous solution gives a *yellow* ppt. with Nitrate of Silver ($AgNO_3$).

## Ammonii Bromidum ($NH_4Br$).

$$HBr + NH_4HO = NH_4Br. + H_2O$$

TESTS—
- (*a*)—In colourless crystals, which become slightly yellow by exposure to the air, and have a pungent, saline taste.
- (*b*)—Readily soluble in water; less soluble in spirit.

## Ammonii Chloridum ($NH_4Cl$).

$$NH_4HO + HCl = NH_4Cl + H_2O$$

TESTS—
- (*a*)—In colourless, inodorous, translucent fibrous masses, tough and difficult to powder; soluble in water and in rectified spirit.
- (*b*)—When heated it volatilises without decomposition, and leaves no residue (absence of fixed salts).
- (*c*)—Its aqueous solution, when heated with Caustic Potash ($KHO$), evolves Ammonia ($NH_4HO$), and when treated with Nitrate of Silver ($AgNO_3$) forms a copious curdy precipitate.

## Amyl Nitris ($C_5H_{11}NO_2$).

$$C_5H_{12}O + Cu + H_2SO_4 + HNO_3 = C_5H_{11}NO_2 + CuSO_4 + 2H_2O$$

TEST—(*a*)—Insoluble in water; soluble in rectified spirit in all proportions; converted by fused Caustic Potash (KHO) into Valerianate of Potassium ($KC_5H_9O_2$).

## Antimonii Chloridi Liquor ($SbCl_3$).

$$Sb_2S_3 + 6HCl = 2SbCl_3 + 3H_2S$$

TESTS—

(*a*)—A heavy liquid, usually of a yellowish red colour; specific gravity 1·47.

(*b*)—A little of it dropped into water gives a ***white*** ppt. (forms oxychloride of Antimony, $2SbCl_3,5Sb_2O_3$), thus $12SbCl_3 + 15H_2O = 2SbCl_3,5Sb_2O_3 + 30HCl$); and the filtered solution lets fall a copious deposit (AgCl) on the addition of Nitrate of Silver ($AgNO_3$), (presence of Hydrochloric Acid—HCl).

(*c*)—If the white ppt. formed by water be treated with Sulphuretted Hydrogen ($H_2S$) it becomes ***orange coloured*** ($Sb_2S_3$).

(*d*)—The orange-coloured ppt. is ***soluble*** in a solution of Tartaric Acid ($H_2C_4H_4O_6$) which solution, if treated with Sulphuretted Hydrogen ($H_2S$), gives an orange ppt. ($Sb_2S_3$).

## Antimonium Nigrum ($Sb_2S_3$).

Native Sulphide of Antimony ($Sb_2S_3$), purified from siliceous matter by fusion, and afterwards finely powdered.

TEST—(*a*)—A greyish-black crystalline powder. It dissolves almost entirely in boiling Hydrochloric Acid (HCl), evolving Sulphuretted Hydrogen ($H_2S$), (Absence of Silica—$SiO_2$).

## Antimonii Oxidum ($Sb_2O_3$).

$$12SbCl_3 + 15H_2O = 2SbCl_3,5Sb_2O_3 + 30HCl.$$

$$2SbCl_3,5Sb_2O_3 + 3Na_2CO_3 = 6Sb_2O_3 + 6NaCl + 3CO_2$$

### Antimonii Oxidum ($Sb_2O_3$).—*Continued.*

TESTS—

(*a*)—A greyish-white powder, fusible at a low red heat; insoluble in water, but readily dissolved by Hydrochloric Acid ($HCl$), and

(*b*)—The solution dropped into distilled water gives a white deposit ($2SbCl_3 5Sb_2O_3$), at once changed to orange ($Sb_2S_3$) by Sulphuretted Hydrogen ($H_2S$).

(*c*)—It dissolves entirely when boiled with an excess of the Acid Tartrate of Potassium ($KHC_4H_4O_6$ (absence of higher oxides of Antimony, as $Sb_2O_5.Sb_4O_8$).

### Antimonium Sulphuratum ($Sb_2S_3Sb_2O_3$)

$$1\ \left\{\begin{array}{l} 2Sb_2S_3 + 6NaHO = 2Na_3SbS_3 + Sb_2O_3 + 3H_2O \\ Sb_2O_3 + 6NaHO = 2Na_3SbO_3 + 3H_2O \end{array}\right.$$

$$2\ \left\{\begin{array}{l} 2Na_3SbS_3 + 3H_2SO_4 = Sb_2S_3 + 3Na_2SO_4 + 3H_2S \\ 2Na_3SbO_3 + 3H_2SO_4 = Sb_2O_3 + 3Na_2SO_4 + 3H_2O \end{array}\right.$$

"The Oxide ($Sb_2O_3$) and Sulphide ($Sb_2S_3$) indicated in these equations, together with an excess of Sulphide of Antimony ($Sb_2S_3$) originally dissolved by the alkaline fluid ($NaHO$), are all precipitated when the Acid ($H_2SO_4$) is added, and form the Sulphurated Antimony ($Sb_2S_3Sb_2O_3$) of the Pharmacopœia."—*Attfield.*

TESTS—

(*a*)—An orange-red powder, readily dissolved by Caustic Soda ($NaHO$), also by Hydrochloric Acid ($HCl$), with the evolution of Sulphuretted Hydrogen ($H_2S$), and the separation of a little sulphur ($S$).

(*b*)—Boiled in water, with Acid Tartrate of Potash ($KHC_4H_4O_6$), the resulting solution is precipitated *orange-red* with Sulphuretted Hydrogen ($H_2S$).

### Antimonium Tartaratum ($KSbC_4H_4O_7,H_2O$).

$$2KHC_4H_4O_6 + Sb_2O_3 = 2KSbC_4H_4O_7H_2O,$$

TESTS—

(*a*)—In colourless transparent crystals, with triangular facets; soluble in water and less so in proof spirit.

(*b*)—Its solution in water gives with Hydrochloric Acid ($HCl$) a white ppt., soluble in excess, and which is not formed if Tartaric Acid ($H_2C_4H_4O_6$) be previously added.

TESTS—
(*c*)—It decrepitates and blackens on the application of heat.
(*d*)—Its solution in distilled water gives an *orange ppt.* ($Sb_2S_3$), with Sulphuretted Hydrogen ($H_2S$).

### Argenti Nitras ($AgNO_3$).

$$3Ag + 4HNO_3 = 3AgNO_3 + 2H_2O + NO$$

TESTS—
(*a*)—In colourless tabular crystals, the primary form of which is the right rhombic prism, or in white cylindrical rods, soluble in distilled water and in rectified spirit.
(*b*)—Its solution gives with Hydrochloric Acid ($HCl$) a *curdy white ppt.*, soluble in Solution of Ammonia ($NH_4HO$), insoluble in boiling Nitric Acid ($HNO_3$).
(*c*)—Ten grains dissolved in two fluid drachms of distilled water give with Hydrochloric Acid ($HCl$) a ppt. which, when washed and thoroughly dried, weighs 8·44 grains (absence of other nitrates).
(*d*)—Heated on Charcoal, with Carbonate of Soda ($Na_2CO_3$) in the reducing flame of the blowpipe, yields bright malleable metallic beads, soluble in Nitric Acid ($HNO_3$).

### Argenti Oxidum ($Ag_2O$).

$$2AgNO_3 + Ca2HO = Ag_2O + Ca2NO_3 + H_2O$$

TESTS—
(*a*)—An olive-brown powder, which, at a low heat, gives off oxygen gas, and is reduced to the metallic state.
(*b*)—It dissolves completely in Nitric Acid ($HNO_3$) without effervescence (absence of Metallic Silver), forming a solution having the character and tests of Nitrate of Silver ($AgNO_3$).
(*c*)—29 grains heated to redness leave 27 grains Metallic Silver (absence of general impurities).

### Arsenicalis Liquor ($As_2O_3$)

Arsenious Anhydride ($As_2O_3$) dissolved in Solution of Carbonate of Potassium ($K_2CO_3$).

TESTS—
(*a*)—Physical characters—A reddish alkaline liquid, having the smell of lavender.
(*b*)—Specific gravity, 1·009.

**TESTS**—(*c*)—After being diluted with water and acidulated with Hydrochloric Acid (HCl) it gives with Sulphuretted Hydrogen ($H_2S$) a *yellow ppt.* ($As_2S_3$).

## Arsenici Hydrochloricus Liquor ($As_2O_3$)

A Solution of Arsenious Anhydride ($As_2O_3$) in Hydrochloric Acid (HCl).

**TESTS**—
(*a*)—Physical characters—A colourless, acid liquid.
(*b*)—Specific gravity, 1·009.
(*c*)—Sulphuretted Hydrogen ($H_2S$) gives at once a bright, *yellow* ppt. ($As_2S_3$).

## Bismuthi Carbonas $2(Bi_2CO_5)H_2O$

$$4(Bi3NO_3) + 3N_4H_{16}C_3O_8 = 2Bi_2CO_5 + 7CO_2 + 12NH_4NO_3$$

**TESTS**—
(*a*)—A white powder, blackened by Sulphuretted Hydrogen ($H_2S$), insoluble in water, but soluble with effervescence in Nitric Acid ($HNO_3$).
(*b*)—When added to Sulphuric Acid ($H_2SO_4$), coloured with Sulphate of Indigo, the colour of the latter is not discharged (absence of Nitrate of Bismuth—$Bi3NO_3$), or Ammonium ($NH_4NO_3$).
(*c*)—Its solution in Nitric Acid gives no ppt. with Dilute Sulphuric Acid ($H_2SO_4$), (absence of Lead Carbonate—$PbCO_3$), or with solution of Nitrate of Silver ($AgNO_3$), (absence of Chlorides as Oxychloride of Bismuth—BiOCl).

## Bismuthi Oxidum ($Bi_2O_3$).

$$2BiONO_3 + 2NaHO = Bi_2O_3 + 2NaNO_3 + H_2O$$

**TESTS**—
(*a*)—A dull, *lemon-yellow* powder.
(*b*)—Heated to incipient redness it is not diminished in weight (absence of moisture and Carbonate or Nitrate of Bismuth.
(*c*)—It is soluble in Nitric Acid ($HNO_3$), and this solution gives no ppt. with diluted Sulphuric Acid ($H_2SO_4$), (absence of Lead Compounds), nor with solution of Nitrate of Silver ($AgNO_3$) dropped into it (absence of Chlorides).

## Bismuthi Subnitras ($BiNO_4H_2O$).

$$\left\{\begin{array}{l} Bi_2 + 8HNO_3 = 2(Bi3NO_3) + 2NO + 4H_2O \\ 5(Bi3NO_3) + 8H_2O = 4(BiNO_4H_2O) + Bi3NO_3 + \\ \quad 8HNO_3 \text{ (Attfield)} \end{array}\right.$$

**Tests**—

(*a*)—A heavy, white powder, in minute crystalline scales, blackened by Sulphuretted Hydrogen, insoluble in water, but soluble in Nitric Acid mixed with half its volume of distilled water forming a solution which, poured into water, gives a white ppt.

(*b*)—The Nitric Acid Solution gives no ppt. with diluted Sulphuric Acid ($H_2SO_4$) (absence of Lead Oxynitrate), nor with Solution of Nitrate of Silver ($AgNO_3$) (absence of Chlorides as Oxychlorides of Bismuth—$BiOCl$).

## Borax ($Na_2B_4O_7 10H_2O$).

$$4HBO_2 + Na_2CO_3 = Na_2B_4O_7 + 2H_2O + CO_2$$

**Tests**—

(*a*)—In transparent colourless crystals, with a weak alkaline reaction; insoluble in Rectified Spirit, soluble in water.

(*b*)—A hot saturated solution, when acidulated with any of the mineral acids, lets fall as it cools a scaly crystalline deposit ($H_3BO_3$), the solution of which in spirit burns with a *green* flame.

## Bromum (Br).

$$2NaBr + 2H_2SO_4 + MnO_2 = Br_2 + Na_2SO_4 + MnSO_4 + 2H_2O$$

**Tests**—

(*a*)—A dark, *brownish-red* very volatile liquid, with a strong disagreeable odour.

(*b*)—Specific gravity, 2·966; boiling point, 117° F.; gives off *red vapours* at the common temperature of the air.

(*c*)—Shaken with Solution of Soda ($NaHO$) so as to make it very alkaline, it forms a colourless liquid, which, if coloured by the further addition of a small quantity of the Bromine, does not become *blue* on the addition of a cold solution of starch (absence of Iodine—I).

### Cadmii Iodidum ($CdI_2$).

$$Cd_2 + I_4 = 2CdI_2$$

TESTS—

(*a*)—In flat, micaceous crystals; white, of a pearly lustre.

(*b*)—Sulphuretted Hydrogen ($H_2S$) precipitates the *yellow sulphide;* insoluble in Potash ($KHO$) and Ammonia ($NH_4HO$), but soluble in strong Hydrochloric Acid ($HCl$).

(*c*)—Its solution gives a white, gelatinous ppt., with excess of Solution of Potash ($KHO$), the filtrate from which is unaffected by Sulphide of Ammonium ($NH_4HS$), (absence of Zinc Iodide—$ZnI_2$).

### Calcii Chloridum ($CaCl_2$).

$$CaCO_3 + 2HCl = CaCl_2 + H_2O + CO_2$$

Carbonate of Calcium ($CaCO_3$) often contains Ferrous Carbonate ($FeCO_3$) which, in the official process, becomes converted into Ferrous Chloride ($FeCl_2$); hence the necessity of adding to the above solution of Chloride of Calcium, Solution of Chlorinated Lime ($Ca2ClO$), and Slaked Lime ($Ca2HO$), thus:—$4FeCl_2 + Ca2ClO + 4Ca2HO + 2H_2O = 2(Fe_26HO) + 5CaCl_2$. Ferric Hydrate, is precipitated.

TESTS—

(*a*)—In white agglutinated masses, dry, but very deliquescent; evolves no Chlorine ($Cl$) or Hypochlorous Acid ($HClO$) on the addition of Hydrochloric Acid ($HCl$), (absence of Hypochlorite of Calcium—$Ca2ClO$), and is entirely soluble in twice its weight of water, also in alcohol.

(*b*)—The aqueous solution is not precipitated by the addition of Lime Water ($Ca2HO$), (absence of Carbonic Acid—$H_2CO_3$ Iron or Magnesia).

### Calcis Carbonas Præcipitata ($CaCO_3$).

$$CaCl_2 + Na_2CO_3 = CaCO_3 + 2NaCl$$

TESTS—

(*a*)—A white, crystalline powder, insoluble in water, soluble in Hydrochloric Acid ($HCl$) with effervescence.

**TESTS—**

(*b*)—The solution, when neutralised by Ammonia ($NH_4HO$), lets fall a copious *white ppt.* on the addition of Oxalate of Ammonia $(NH_4)_2C_2O_4)$.

(*c*)—With diluted Nitric Acid ($HNO_3$) it gives a clear solution, which, if perfectly neutral, and deprived of Carbonic Acid ($H_2CO_3$), by boiling, is not precipitated by Saccharated Solution of Lime added in excess (absence of oxide of Iron, Alumina, and Phosphates), or by the Solution of Nitrate of Silver ($AgNO_3$) (absence of Chlorides).

## Calcis Hydras ($CaH_2O_2$).

$$CaO + H_2O = CaH_2O_2$$

**TESTS—**

(*a*)—Its solution (Lime Water) gives a *white ppt.* with Oxalic Acid ($H_2C_2O_4$), or Oxalate of Ammonia $(NH_4)_2C_2O_4$, and

(*b*)—Gives a *white ppt.* on passing Carbonic Acid ($H_2CO_3$) through it.

## Calcis Hypophosphis ($Ca2PH_2O_2$).

$$8P + 6H_2O + 3CaH_2O_2 = 3(Ca2PH_2O_2) + 2PH_2$$

**TESTS—**

(*a*)—A white, crystalline salt, with a pearly lustre and bitter taste; insoluble in Rectified Spirit, soluble in six parts of cold water, and only slightly more soluble in hot water.

(*b*)—Heated to redness the crystals ignite, evolving spontaneously inflammable Phosphuretted Hydrogen ($PH_3$), and leaving a reddish-coloured residue, amounting to 80 per cent. of the salt.

## Calcis Phosphas ($Ca_3P_2O_8$).

$$\begin{cases} Ca_32PO_4 + 4HCl = CaH_42PO_4 + 2CaCl_2 \\ CaH_42PO_4 + 2CaCl_2 + 4NH_4HO = Ca_3P_2O_8 + 4NH_4Cl \\ \quad + 4H_2O \end{cases}$$

**TESTS—**

(*a*)—A light, white amorphous powder, insoluble in water, but soluble in Dilute Nitric Acid ($HNO_3$) without effervescence (absence of Carbonate of Calcium—$CaCO_3$).

TESTS—

(*b*)—Ten grains dissolve perfectly and without effervescence in diluted Hydrochloric Acid ($HCl$) (absence of sand, &c.), and the solution yields with Ammonia ($NH_4HO$) a *white ppt.* insoluble in boiling Solution of Potash ($KHO$) (absence of Alumina), and weighing ten grains when washed and dried.

(*c*)—Oxalate of Ammonia, ($(NH_4)_2C_2O_4$) produces a *white ppt.* (Oxalate of Calcium—$CaC_2O_4$) soluble in Hydrochloric ($HCl$) or Nitric Acid ($HNO_3$), but insoluble in Acetic ($C_2H_4O_2$) or in Oxalic ($H_2C_2O_4$) Acid.

## Calx ($CaO$).

$$CaCO_3 + \text{Heat} = CaO + CO_2$$

TESTS—

(*a*)—In compact whitish masses, which readily absorb water, crack, and fall into powder with the development of much heat; slightly soluble in water. Its solution in water gives a *white ppt.* with Oxalate of Ammonia, $(NH_4)_2C_2O_4$).

(*b*)—It dissolves without effervescence in diluted Hydrochloric Acid ($HCl$) (absence of Carbonate of Calcium—$CaCO_3$); and if the solution thus formed be evaporated to dryness, and the residue redissolved in water, only a very scanty ppt. forms on the addition of Saccharated Solution of Lime (absence of Phosphates).

## Calx Chlorata ($CaCl_2,CaCl_2O_2$).

$$2CaH_2O_2 + 2Cl_2 = CaCl_2\,CaCl_2O_2 + 2H_2O$$

TEST—

(*a*)—A dull white powder, with a feeble smell of Chlorine ($Cl$), partially soluble in water. The solution evolves Chlorine ($Cl$) copiously on the addition of Oxalic Acid ($H_2C_2O_4$), and deposits at the same time a *white ppt.* of Oxalate of Calcium ($CaC_2O_4$).

## Cerii Oxalas ($CeC_2O_4,3H_2O$).

$$\begin{cases} CeO + 2HCl = CeCl_2 + H_2O \\ CeCl_2 + (NH_4)_2C_2O_4 = CeC_2O_4 + 2NH_4Cl \end{cases} \text{(Barber)}$$

**Cerii Oxalas** $CeC_2O_4,3H_2O$).—*Continued.*

TESTS—

(*a*)—A white granular powder, insoluble in water, decomposed at a dull-red heat into a reddish-brown powder, which dissolves completely and without effervescence in boiling Hydrochloric Acid ($HCl$) (absence of various metallic Carbonates or Oxalates); and the resulting solution gives with Solution of Sulphate of Potash ($K_2SO_4$) a white crystalline ppt., double Sulphate of Cerium and Potassium ($K_2Ce2SO_4$)

(*b*)—If the salt be boiled with Solution of Potash ($KHO$) and filtered, the filtrate is not affected by Solution of Chloride of Ammonium ($NH_4Cl$) (absence of Alumina).

(*c*)—10 grains, when incinerated, lose 5·2 grains by weight (absence of general impurities).

**Chloral Hydras** ($C_2HCl_3O.H_2O$).

$$\begin{cases} C_2H_5HO + Cl_2 = C_2H_4O + 2HCl \\ C_2H_4O + Cl_6 = C_2HCl_3O + 3HCl \end{cases}$$

TESTS—

(*a*)—In colourless crystals, which do not deliquesce on exposure to air. Has a pungent smell and pungent bitter taste.

(*b*)—Soluble in less than its own weight of distilled water, Rectified Spirit or Ether ($C_4H_{10}O$), and in four times its weight of Chloroform ($CHCl_3$).

(*c*)—The aqueous solution is neutral, or but slightly acid to litmus paper (absence of free acid.)

(*d*)—A solution in Chloroform ($CHCl_3$) when mixed by shaking with Sulphuric Acid ($H_2SO_4$), does not impart colour to the Acid ($H_2SO_4$) (absence of other organic bodies).

(*e*)—Distilled with lime, should yield 70 per cent. Chloroform ($CHCl_3$).

**Chlori Liquor** ($Cl.H_2O$).

$$MnO_2 + 4HCl = Cl_2 + 2H_2O + MnCl_2$$

TESTS—

(*a*)—A yellowish-green liquid, smelling strongly of Chlorine, and immediately discharging the colour of a dilute solution of Sulphate of Indigo.

(*b*—)Specific gravity, 1·003.

(*c*—)On evaporation it leaves no residue (absence of fixed matter).

## Chloroform. ($CHCl_3$).

$$\left\{\begin{array}{l} 2C_2H_5HO + O_2 = 2C_2H_4O + 2H_2O \\ C_2H_4O + 3Cl_2 = C_2HCl_3O + 3HCl \\ 2C_2HCl_3O + Ca2HO = 2CHCl_3 + Ca2CHO_2 \text{ (Attfield).} \end{array}\right.$$

**Tests**—
(*a*)—A limpid colourless liquid, of an agreeable ethereal smell and sweet taste. Specific gravity, 1·49. Soluble in Alcohol and Ether.
(*b*)—It is not coloured by agitation with Sulphuric Acid ($H_2SO_4$), (absence of Hydrocarbons).
(*c*)—Burns, though not readily, with a green and smoky flame.

## Creasotum ($C_2H_{10}O_2$ and $C_7H_8O_2$).

**Tests**—
(*a*)—A liquid, colourless, or with a yellowish tinge, having a strong empyreumatic smell. It coagulates albumen.
(*b*)—It is sparingly dissolved by water, but freely by Alcohol ($C_2H_6O$), Ether ($C_4H_{10}O$), and Glacial Acetic Acid ($C_2H_4O_2$). Specific Gravity, 1·071.
(*c*)—Dropped on white filtering paper, and exposed to a heat of 212° F., it leaves *no translucent stain. It turns* the plane of polarisation of a ray of polarised light *to the right. It is not solidified* by the cold produced by a mixture of Hydrochloric Acid (HCl) and Sulphate of Soda ($Na_2SO_4$). (These latter tests prove the absence of Carbolic Acid—$HC_6H_5O$).

## Creta ($CaCO_3$).

Native friable Carbonate of Lime.

Tests and Impurities same as for Calc. Carb. Præcip.

## Creta Præparata ($CaCO_3$).

A white amorphous powder. Tests and Impurities same as for Calc. Carb. Præcip.

**Cupri Sulphas ($CuSO_45H_2O$).**

$$Cu + 2H_2SO_4 = CuSO_4 + SO_2 + 2H_2O$$

TESTS—
- (*a*)—A blue crystalline salt, in oblique prisms, soluble in water, forming a strongly acid blue liquid. This aqueous solution gives a *white ppt.* with Chloride of Barium ($BaCl_2$); insoluble in Hydrochloric Acid ($HCl$), and
- (*b*)—A *maroon-red ppt.*, with yellow Prussiate of Potash ($K_4FeCy_6$).
- (*c*)—A *light blue* ppt. falls on the addition of Solution of Ammonia ($NH_4HO$); soluble in excess, forming a *deep blue* Solution of Ammonio-Sulphate of Copper.
- (*d*)—Polished Steel, in Copper Sulphate ($CuSO_4$) Solution, is coated with metallic copper.

**FERRIC SALTS—**

**Ferri Acetatis Tinctura ($Fe_26C_2H_3O_2$ .**

$$Fe_23SO_4 + 6KC_2H_3O_2 = Fe_26C_2H_2O_2 + 3K_2SO_4$$

TESTS—
- *(a)*—A dark-brown liquid with an acetous odour.
- *(b)*—Ferrocyanide of Potassium ($K_4FeCy_6$) gives a *deep blue ppt.* = Prussian Blue ($Fe_7Cy_{18}$).

**Ferri Oxidum Magneticum ($Fe_3O_44H_2O$).**

$$Fe_23SO_4 + FeSO_4 + 8NaHO = Fe_3O_4, 4H_2O + 4Na_2SO_4$$

TESTS—
- *(a)*—A brownish-black tasteless powder, strongly attracted by the magnet.
- (*b*)—It dissolves without effervescence in Hydrochloric Acid, diluted with half its volume of water (absence of Metallic Iron), and the solution thus obtained gives blue precipitates with the red and yellow prussiates of potash.

**Ferri Peroxidum Humidum ($Fe_2O_33H_2O$) or Ferric Hydrate.**

$$Fe_23SO_4 + 6NaHO = Fe_2O_3,3H_2O + 3Na_2SO_4$$

TESTS—
- (*a*)—A soft moist pasty reddish-brown mass.
- (*b*)—It dissolves readily in cold diluted Hydrochloric Acid (absence of Ferric Oxyhydrate).
- *(c)*—And the solution gives a copious blue ppt. with the yellow, but not with the red Prussiate of Potash (absence of Ferrous Hydrate).

### Ferri Peroxidum Hydratum ($Fe_2O_3H_2O$).

$$Fe_2O_33H_2O = Fe_2O_3H_2O + 2H_2O$$

TESTS—
(a)—A reddish-brown powder, which gives off moisture when heated to dull redness. It is not magnetic.
(b)—It dissolves with heat in diluted Hydrochloric Acid.

### Ferri Perchloridi Liquor Fortior ($Fe_2Cl_6$).

$$\begin{cases} Fe + 2HCl = FeCl_2 + H_2 \\ 6FeCl_2 + 6HCl + 2HNO_3 = 3Fe_2Cl_6 + 2NO + 4H_2O \end{cases}$$

TESTS—
(a)—Specific gravity, 1·44. An orange-brown liquid.
(b)—Is not pptd. blue by Red Prussiate of Potash (absence of Ferrous Salts).

### Ferri Pernitratis Liquor ($Fe_26NO_3$).

$$Fe_2 + 8HNO_3 = Fe_26NO_3 + 2NO + 4H_2O$$

TESTS—
(a)—Specific gravity, 1·107. A reddish-brown liquid.
(b)—It gives no ppt. with red Prussiate of Potash (absence of Ferrous Salts.)

### Ferri Persulphatis Liquor ($Fe_23SO_4$).

$$6FeSO_4 + 3H_2SO_4 + 2HNO_3 = 3(Fe_23SO_4) + 2NO + 4H_2O$$

TESTS—
(a)—Specific gravity, 1·441. A dense dark red liquid.
(b)—Gives no ppt. with red Prussiate of Potash (absence of Ferrous Salts).

### Ferrum Redactum (Fe and $Fe_3O_4$).

$$Fe_2O_3H_2O + H_6 = Fe_2 + 4H_2O.$$

$$3Fe_2O_3 + H_2 = 2Fe_3O_4 + H_2O$$ (Walter Smith).

TESTS—
(a)—A greyish black powder, strongly attracted by the magnet.
(b)—10 grains, added to an aqueous solution of 50 grains of Iodine, and 50 grains of Iodide of Potassium, and gently heated together in a small flask, leave not more than 5 grains undissolved, which should be entirely soluble in Hydrochloric Acid = 50 per cent. of metallic iron.

**Ferri et Ammoniæ Citras.** (Formula uncertain.)

TESTS—

(*a*)—In thin red *scales* very soluble in water.

(*b*)—Heated with Solution of Potash it evolves Ammonia and deposits Peroxide of Iron. The alkaline solution, from which the iron has been separated, does not, when slightly supersaturated with Acetic Acid, give a crystalline deposit of Acid Tartrate of Potassium ($KHC_4H_4O_6$). (Absence of Tartrate of Iron and Ammonia).

**Ferri et Quiniæ Citras.** (Formula uncertain.)

TESTS—

(*a*)—In thin greenish-golden deliquescent *scales* soluble in water.

(*b*)—When burned, with exposure to air, it leaves a residue which, when moistened with water, is not alkaline to litmus paper (absence of Potassium or Sodium Salts).

(*c*)—50 grains dissolved in an ounce of water, and treated with a slight excess of Ammonia, give a white ppt. which, when collected on a filter and dried, weighs 8 grains = 16 per cent. of Quinia.

(*d*)—The ppt. is almost entirely soluble in pure ether (absence of Alkaloids, as Cinchonia or Quinidia).

**Ferrum Tartaratum ($KFeO,C_4H_4O_6$).**

TESTS—

(*a*)—In thin garnet *scales* soluble in water.

(*b*)—The aqueous solution, when acidulated with Hydrochloric Acid, gives a copious blue ppt. with the Yellow, but none with the Red Prussiate of Potash (absence of Ferrous compounds).

(*c*)—When the salt is boiled, with a solution of Soda, Peroxide of Iron separates, but no Ammonia is evolved (absence of Ammoniacal Salts).

(*d*)—By burning 50 grains of it at a red heat, washing what is left with distilled water, and again burning, a residue of Peroxide of Iron is obtained, weighing 15 grains = 30 per cent. of Ferric Oxide.

☞ The above are known as the "scale" preparations of iron.

*General Tests of the Ferric Salts—*

TESTS—
(*a*)—Sulphuretted Hydrogen ($H_2S$) gives a ***milky-white ppt.*** of sulphur, and reduces them to Ferrous Salts.
(*b*)—Sulphocyanide of Potassium (KCyS) gives a deep ***blood-red colour***. The colour is destroyed by Perchloride of Mercury ($HgCl_2$) and Phosphoric Acid ($H_3PO_4$).
(*c*)—Ferrocyanide of Potassium ($K_4FeCy_6$) gives a ***deep blue ppt.*** (Prussian Blue—$Fe_7Cy_{18}$).
(*d*)—Ferridcyanide of Potassium ($K_3FeCy_6$) gives ***no ppt.***, but only a greenish-brown colour.
(*e*)—Tincture of Galls gives an immediate ***black ppt.***

## FERROUS SALTS—

### Ferri Arsenias ($Fe_3As_2O_8$)

$$2Na_2HAsO_4 + 2NaC_2H_3O_2 + 3FeSO_4 = Fe_3As_2O_8 + 3Na_2SO_4 + 2HC_2H_3O_2$$

TESTS—
(*a*)—A tasteless green powder, insoluble in water.
(*b*)—Its solution in Hydrochloric Acid gives no ppt. with Chloride of Barium, ($BaCl_2$) (absence of Sulphate of Sodium.)

### Ferri Carbonas Saccharata ($FeCO_3$)

TESTS—
(*a*)—In small coherent lumps of a grey colour, with a sweet chalybeate taste.
(*b*)—Its solution in Hydrochloric Acid gives a very slight ppt. with Chloride of Barium (absence of Sulphates).

### Ferri Iodidum ($FeI_2$).

$$Fe + 2I = FeI_2$$

TESTS—
(*a*)—A crystalline, green, deliquescent salt, soluble in water.
(*b*)—Mixed with mucilage of starch, its solution acquires a blue colour by the addition of a minute quantity of Chlorine.

### (Ferri Phosphas ($Fe_3P_2O_8$).

$$3FeSO_4 + 2Na_2HPO_4 + 2NaC_2H_3O_2 = Fe_3P_2O_8 + 3Na_2SO_4 + 2HC_2H_2O_2$$

**Ferri Phosphas ($Fe_3P_2O_8$).**—*Continued.*

TESTS—
(*a*)—A slate-blue amorphous powder, insoluble in water.
(*b*)—When the salt is digested in Hydrochloric Acid, with a thin plate of pure copper, *no dark deposit* forms on the metal (absence of Arsenic).

**Ferri Sulphas ($FeSO_4 7H_2O$). Ferri Sulphas Exsiccata ($FeSO_4 H_2O$). Ferri Sulphas Granulata ($FeSO_4 7H_2O$).**

$$Fe_2 + 2H_2SO_4 = 2FeSO_4 + 2H_2$$

TESTS—
(*a*)—Soluble in water (absence of Ferric Oxysulphate).
(*b*)—It gives no ppt. with Sulphuretted Hydrogen (absence of Ferric Compounds or Copper).
(*c*)—The aqueous solution gives a *white* ppt. with Chloride of Barium; a *blue* with the red, and a nearly *white* with the yellow Prussiate of Potash.

*General Tests of the Ferrous Salts*—

TESTS—
(*a*)—Acidulated Sulphuretted Hydrogen ($H_2S$) gives no ppt.
(*b*)—Sulphide of Ammonium ($NH_4HS$) gives a ppt. of *greenish-black* Hydrated Sulphide ($FeS$).
(*c*)—Ferridcyanide of Potassium ($K_3FeCy_6$) gives a *rich blue ppt.* (Turnbull's blue—$Fe_5Cy_{12}$).
(*d*)—Ferrocyanide of Potassium ($K_4FeCy_6$) gives a *pale blue* ppt., which rapidly becomes a deep blue, owing to absorption of oxygen.
(*e*)—Gives a green glass with borax in the blowpipe (reducing) flame.

**Glycerinum ($C_3H_8O_3$).**

$$3NaHO + C_3H_5 3C_{18}H_{33}O_2 = C_3H_8O_3 + 3NaC_{18}H_{33}O_2$$

TESTS—
(*a*)—Specific gravity, 1·25. A clear, oily-looking liquid, without odour.
(*b*)—Freely soluble in water and alcohol.
(*c*)—When decomposed by heat it evolves intensely irritating vapours.

### Hydrargyrum (Hg).

TESTS—
(*a*)—A metal, fluid at common temperatures, brilliantly lustrous, and easily divisible into spherical globules.
(*b*)—It volatilises at a heat below that of visible redness, leaving no residue (absence of metals, as lead, tin, &c.)

## MERCURIC SALTS—

### Hydrargyrum Ammoniatum ($NH_2HgCl$).

$$HgCl_2 + 2NH_4HO = NH_2HgCl + NH_4Cl + 2H_2O$$

TESTS—
(*a*)—An opaque, white powder, on which cold Water, Alcohol, and Ether have no action (absence of Perchloride of Mercury—$HgCl_2$).
(*b*)—Entirely volatilised at a heat under redness (absence of fixed salts).

### Hydrargyri Flava Lotio ($HgO$—in water).

$$HgCl_2 + Ca2HO = HgO + CaCl_2 + H_2O$$

### Hydrargyri Iodidum Rubrum ($HgI_2$).

$$HgCl_2 + 2KI = HgI_2 + 2KCl$$

TESTS—
(*a*)—A crystalline powder, of a ***vermilion colour***, becoming *yellow* when gently heated over a lamp on a sheet of paper.
(*b*)—Almost insoluble in Water; dissolves sparingly in Alcohol, but freely in Ether, or in an aqueous solution of Iodide of Potassium,
(*c*)—Entirely volatilised by a heat under redness (absence of fixed salts, as lead, zinc, &c).

### Hydrargyri Nitratis Acidus Liquor ($Hg2NO_3$).

$$3Hg + 8HNO_3 = 3(Hg2NO_3) + 2NO + 4H_2O$$

TESTS—
(*a*)—A colourless, strongly acid solution. Specific gravity 2·246.
(*b*)—Gives a *yellow ppt.* ($HgO$) with excess of KHO.
(*c*)—It does not give any ppt. when a little of it is dropped into Hydrochloric Acid, diluted with twice its volume of water (absence of Mercurous Nitrate—$HgNO_3$).

### Hydrargyri Oxidum Flavum (HgO)

$$HgCl_2 + 2NaHO = HgO + 2NaCl + H_2O$$

TESTS—
(*a*)—A yellow powder, readily dissolved by Hydrochloric Acid; yielding a solution which, with solution of Ammonia, gives a white ppt.
(*b*)—It is entirely volatilised when heated to incipient redness (absence of fixed salts, as Chloride of Sodium).

### Hydrargyri Oxidum Rubrum (HgO).

$$Hg + Hg2NO_3 = 2HgO + 2NO_2$$

TESTS—
(*a*)—An orange-red powder, readily dissolved by Hydrochloric Acid; yielding a solution which, with Caustic Potash added in excess, gives a *yellow* ppt., and with Solution of Ammonia, a *white* ppt.
(*b*)—Entirely volatilised by a heat under redness (absence of fixed salts).
(*c*)—If this be done in a test-tube no *orange* vapours are perceived (absence of Nitrate of Mercury).

### Hydrargyri Perchloridum ($HgCl_2$).

$$HgSO_4 + 2NaCl = HgCl_2 + Na_2SO_4$$

If the Mercuric Sulphate ($HgSO_4$) contain any Mercurous Sulphate ($Hg_2SO_4$), some Calomel (HgCl) may be formed. This result may be avoided if 2 or 3 per cent. of Dioxide of Manganese be previously mixed with the ingredients, the action of which is to eliminate Chlorine (Cl) from the excess of Chloride of Sodium used in the process, the Chlorine converting any Calomel (HgCl) into Perchloride of Mercury ($HgCl_2$) (Attfield).

TESTS—
(*a*)—In heavy colourless masses of prismatic crystals, having a metallic taste.
(*b*)—When heated it sublimes without decomposing, or leaving any residue (absence of fixed salts).
(*c*)—Its solubility in Water, Spirit, and Ether distinguish it from HgCl.

### Hydrargyri Sulphas ($HgSO_4$).

$$Hg + 2H_2SO_4 = HgSO_4 + SO_2 + 2H_2O$$

TESTS—
(*a*)—A white, crystalline, heavy powder, rendered yellow with affusion of water.
(*b*)—Entirely volatilised by heat (absence of fixed salts).

*General Tests of the Mercuric Salts*—

TESTS—
(*a*)—Sulphuretted Hydrogen ($H_2S$) gives a ***dirty-white***, becoming finally a black ppt. ($HgS$)
(*b*)—Iodide of Potassium ($KI$) gives a ***scarlet*** ppt. ($HgI_2$)
(*c*)—Caustic Alkalies, Potash, Lime and Soda give a *yellow* ppt. of ($HgO$).
(*d*)—Stannous Chloride ($SnCl_2$) produces, when added in small quantities, a *white* ppt ($HgCl$), but, on adding an excess, metallic mercury ($Hg$) falls as a *grey powder*.
(*e*)—Hydrochloric Acid ($HCl$) and Chlorides give ***no*** ppt.

## MERCUROUS SALTS—

**Hydrargyri Iodidum Viride ($HgI$).**

$$2Hg + I_2 = 2HgI$$

TESTS—
(*a*)—A dull-green powder insoluble in water, which darkens in colour upon exposure to light.
(*b*)—When it is shaken in a tube with Ether, nothing is dissolved (absence of Hydrargyri Iodidum Rubrum, $HgI_2$).

**Hydrargyri Nigra Lotio ($Hg_2O$—in water).**

$$2HgCl + Ca2HO = Hg_2O + CaCl_2 + H_2O$$

**Hydrargyri Subchloridi ($HgCl$).**

$$Hg_2SO_4 + 2NaCl = 2HgCl + Na_2SO_4$$

TESTS—
(*a*)—A dull-white, heavy, and nearly tasteless powder, rendered yellowish by trituration in a mortar; insoluble in Water, Spirit, or Ether.
(*b*)—Warm Ether, which has been shaken with it in a bottle, leaves, on evaporation, no residue (absence of Perchloride of Mercury, $HgCl_2$).
(*c*)—It is entirely volatilised by a sufficient heat (absence of fixed salts).

*Tests of the Mercurous Salts—*

TESTS—
(*a*)—Caustic Alkalies, as Potash, Lime, and Soda, give a *black* ppt. ($Hg_2O$.)
(*b*)—Iodide of Potassium (KI) gives a *green* ppt.
(*c*)—Yellow Chromate of Potassium ($K_2CrO_4$) gives a *red* ppt.

### Iodum (I).

$$2NaI + 2H_2SO_4 + MnO_2 = I_2 + Na_2SO_4 + MnSO_4 + 2H_2O$$

TESTS—
(*a*)—In laminar crystals, with an acrid taste, dark colour, and metallic lustre, which, when heated, yield a beautiful *violet-coloured* vapour.
(*b*)—The aqueous solution strikes a *deep blue* colour with starch.
(*c*)—It stains the skin *yellow*.
(*d*)—It sublimes without leaving any residue (absence of fixed salts), and the portion that first comes over does not include any slender colourless prisms, emitting a pungent odour (absence of Cyanide of Iodine).

### Lithiæ Carbonas ($L_2Co_3$).

TESTS—
(*a*)—In white powder, or in fine crystalline grains.
(*b*)—10 grains of the salt neutralised with Sulphuric Acid, and afterwards heated to redness, leave 14·86 grains of dry Sulphate of Lithia ($L_2SO_4$) which, when redissolved in distilled water, yields no ppt. with Oxalate of Ammonia (absence of Calcium Salts), or Solution of Lime (absence of Alumina).
(*c*)—It gives a *crimson* colour to the blowpipe flame.

### Lithiæ Citras ($L_3C_2H_5O_7$).

$$3L_2CO_3 + 2H_2C_6H_5O_7 = 2L_3C_5H_5O_7 + 3H_2O + 3CO_2$$

TESTS—
(*a*)—A white, amorphous powder, deliquescent, and soluble in water, without leaving any residue.
(*b*)—20 grains, burned at a low red heat, with free access of air, leave 10·6 grains of white residue. (Carbonate of Lithia—$L_2CO_3$).

**Magnesia (Mgo).**

$$3MgCO_3,Mg2HO = 4MgO + H_8O + 3CO_2$$

TESTS—

(*a*)—A white powder, insoluble in water; soluble in acids without effervescence (absence of Carbonate of Magnesia, $(MgCO_3)_3MgO,5H_2O$).

(*b*)—Its solution in Nitric Acid, when neutralised with a mixture of Ammonia and Chloride of Ammonium, does not give any ppt. with Oxalate of Ammonia (absence of Calcium Hydrate or Carbonate), or Chloride of Barium (absence of Sulphates of Magnesium or Sodium).

**Magnesia Levis (MgO).**

TEST—

(*a*)—A bulky, white powder, differing from Magnesia (MgO) only in being lighter, the volumes corresponding to the same weight being to each other in the ratio of 3½ to 1.

**Magnesiæ Carbonas**
**Magnesiæ Carbonas Levis** } $(MgCO_3)_3MgO.5H_2O$.

$$4MgSO_4 + 4Na_2CO_3 + 5H_2O = (MgCO_3)_3MgO5H_2O + 4Na_2SO_4 + CO_2$$

TESTS—

(*a*—A white, granular powder, which dissolves with effervescence in dilute Mineral Acids.

*b*)—With excess of Hydrochloric Acid it forms a clear solution, in which Chloride of Barium causes no ppt. (absence of Magnesium or Sodium Sulphates).

(*c*)—Another part of the solution, supersaturated with Ammonia, gives no ppt. with Oxalic Acid (absence of Carbonate of Calcium) or Sulphuretted Hydrogen (absence of Iron, Lead, &c.)

(*d*)—50 grains burned at a red heat are reduced to 22 grains.

**Magnesiæ Sulphas ($MgSO_4,7H_2O$).**

$$MgCO_3 + H_2SO_4 = MgSO_4 + H_2O + CO_2$$

TESTS—
- (*a*)—In minute, colourless, and transparent prisms, having a bitter taste, and being readily soluble in water.
- (*b*)—Its aqueous solution, at ordinary temperatures, is not pptd. by Oxalate of Ammonia (absence of Sulphate of Calcium).
- (*c*)—Nor should it give a brown ppt. with Chlorinated Lime or Soda (absence of Iron Sulphate).
- (*d*)—No ppt. with Sulphide of Ammonia (absence of $ZnSO_4$).

***Tests of the Magnesia Salts*—**

TESTS—
- (*a*)—Phosphate of Ammonia ($(NH_4)_2HPO_4$), with Solution of Ammonia ($NH_4HO$) gives a ***white ppt.*** ($MgNH_4PO_4$), soluble in Acetic Acid ($C_2H_4O_2$).
- (*b*)—A ***pink mass*** is obtained by heating on Charcoal in the blow-pipe flame, and moistening with Chloride of Cobalt ($CoCl_2$).

## Manganesii Oxidum Nigrum ($MnO_2$).

TESTS—
- (*a*)—A heavy, black powder, which dissolves almost entirely in Hydrochloric Acid, with evolution of Chlorine, and gives off Oxygen when heated to redness.
- (*b*)—To its solution in Hydrochloric Acid add Sulphuretted Hydrogen and Ammonia ; a ***flesh-coloured*** ppt. is formed ($MnS$), soluble in Acids.
- (*c*)—Fused on platinum foil, with Carbonate of Sodium ($Na_2CO_3$), and Nitrate of Potassium ($KNO_3$), it is changed into green Manganate of Sodium ($Na_2MnO_4$).

## Morphiæ Acetas ($C_{17}H_{19}NO_3C_2H_4O_2$).

A white powder, soluble in water and spirit.
Tests, the same as for Morphia.

## Morphiæ Hydrochloras ($C_{17}H_{19}NO_3HCl\,3H_2O$).

In white, flexible, needle-shaped prisms, of a silky lustre, not changed by exposure to the air, and soluble in water and spirit. Twenty grains of the salt dissolved in half an ounce of warm water by the addition of Ammonia in very slight excess, give a ppt. which when washed with cold water, dried by exposure to the air, weighs 15·18 grs.

*Tests for Morphia Salts—*

TESTS—

(*a*)—On the addition of Strong Nitric Acid ($HNO_3$) an *orange-red* coloration is produced.
(*b*)—A deep *blue* is produced when a neutral solution of Perchloride of Iron is added.
(*c*)—Morphia decomposes Iodic Acid ($HIO_3$), liberating Iodine, which gives a *brown* tinge to the mixture, and strikes a *blue* with Starch.
(*d*)—With Sulphuric Acid ($H_2SO_4$) no effect is produced, but a *bright green* strikes out when a crystal of Bichromate of Potash ($K_2Cr_2O_7$) is added.

## Phosphorus (P).

$$\begin{cases} Ca_32PO_4 + 2H_2SO_4 = H_4Ca2PO_4 + 2CaSO_4 \\ 3H_4Ca2PO_4 = Ca_32PO_4 + 4H_3PO_4 \\ 4H_3PO_4 + 16C = P_4 + 6H_2 + 16CO \end{cases}$$

TESTS—

(*a*)—A semi-transparent, colourless, wax-like solid, which emits *white* vapours when exposed to the air.
(*b*)—Insoluble in water, soluble in Ether, Bisulphide of Carbon ($CS_2$), and Boiling Oil of Turpentine.

## Plumbi Acetas, $Pb(C_2H_3O_2)_2,3H_2O$.

$$PbO + 2HC_2H_4O_2 = Pb(C_2H_3O_2)_2 + H_2O$$

TESTS—

(*a*)—In white crystalline masses, slightly efflorescent, having an acetous smell, and sweet astringent taste.
(*b*)—Its solution in water is pptd. *white* by Sulphuric Acid, Acetic Acid being set free.

## Plumbi Subacetatis Liquor ($Pb_2C_4H_6O_5$).

$$PbO + Pb(C_2H_3O_2)_2 = Pb_2C_4H_2O_5$$

TESTS—

(*a*)—A dense, clear, colourless liquid, with alkaline reaction, and sweet astringent taste; becoming turbid by exposure to the air, and forming with Mucilage of Gum Arabic an *opaque* white jelly (Gummate of Lead).
(*b*)—Specific gravity 1·26.

### Plumbi Carbonas ($2PbCO_3,PbO,H_2O$).

TESTS—
- (*a*)—A soft, heavy, white powder, insoluble in water; soluble with effervescence in Diluted Acetic Acid, without leaving any residue (absence of Sulphates of Lead and Barium).
- (*b*)—The Acetic Acid Solution, when treated with excess of Sulphuretted Hydrogen, boiled and filtered, gives no ppt. with Oxalate of Ammonia (absence of Lime Salts).

### Plumbi Iodidum ($PbI_2$).

$$Pb2NO_3 + 2KI = PbI_2 + 2KNO_3$$

A bright yellow powder, soluble in boiling water, the cold solution depositing *golden scales*.

### Plumbi Nitras ($Pb(NO_3)_2$).

$$PbO + 2HNO_3 = Pb(NO_3)_2 + H_2O$$

TESTS—
- (*a*)—In colourless, almost opaque, octahedral crystals, of a sweetish, astringent taste; soluble in water and alcohol.
- (*b*)—Its solution gives a *yellow* ppt. ($PbI_2$) with Iodide of Potassium (KI).

### Plumbi Oxidum (PbO).

$$Pb + O = PbO.$$

TESTS—
- (*a*)—In heavy scales, of a pale *brick-red* colour, completely soluble, without effervescence, in diluted Nitric and Acetic Acids (absence of Carbonates).
- (*b*)—Its solution in diluted Nitric Acid, when supersaturated with Ammonia, and then cleared by filtration, does not show a *blue colour* (absence of Copper).

*General Tests of the Lead Salts*—

TESTS—
- (*a*)—Sulphuretted Hydrogen ($H_2S$) gives a *brownish-black ppt.* (PbS).
- (*b*)—Sulphuric Acid ($H_2SO_4$) gives a *white ppt.* ($PbSO_4$).
- (*c*)—Iodide of Potassium (KI) gives a *bright yellow ppt.* ($PbI_2$).

**TESTS—**

(*d*)—Chromate of Potassium ($K_2CrO_4$) gives a ***yellow ppt.*** ($PbCrO_4$), soluble in Caustic Soda ($NaHO$).

(*e*)—"Heated on charcoal, with Bicarbonate of Soda ($NaHCO_3$), yields malleable beads of lead, and a *yellow* incrustation of Oxide of Lead ($PbO$) on the charcoal."—(Jones.)

**Potassa Caustica ($KHO$).**

$$K_2CO_3 + Ca2HO = 2KHO + CaCO_3$$

**TESTS—**

(*a*)—In hard, white pencils, very deliquescent, strongly alkaline and corrosive,

(*b*)—A watery solution, acidulated by Nitric Acid, gives with Perchloride of Platinum ($PtCl_4$) a yellow crystalline ppt. ($2KCl + PtCl_4$), and only scanty *white ppts.* with Nitrate of Silver ($AgNO_3$), (absence of Chloride of Potassium), and with Chloride of Barium ($BaCl_2$), (absence of Sulphate of Potassium).

**Potassa Sulphurata ($K_2S_2O_3 2K_2S_3$).**

$$3K_2CO_3 + 4S_2 = K_2S_2O_3 + 2K_2S_3 + 3CO_2$$

**TESTS—**

(*a*)—In solid, greenish fragments, liver-brown, when recently broken, alkaline, and acrid to the taste; readily forming with water a yellow solution, which has the smell of Sulphuretted Hydrogen, and evolves it freely when excess of Hydrochloric Acid is dropped into it, sulphur being at the same time deposited.

(*b*)—About three-fourths of its weight are dissolved by Rectified Spirit. (Shows absence of Sulphate of Potassium.).

**Potassæ Acetas ($KC_2H_3O_2$).**

$$K_2CO_3 + 2HC_2H_3O_2 = 2KC_2H_3O_2 + H_2O + CO_2$$

**TESTS—**

(*a*)—In white, deliquescent, foliaceous satiny masses, the watery solution of which gives a ***deep red colour***, with a dilute solution of Perchloride of Iron ($Fe_2Cl_6$).

(*b*)—Neutral to litmus paper; entirely soluble in Rectified Spirit; does not effervesce with acids (absence of Carbonate of Potash).

(*c*)—Its solution is unaffected by Sulphide of Ammonium ($NH_4HS$), (absence of Iron and metallic Salts.)

**Potassæ Bicarbonas ($KHCO_3$).**

$$K_2CO_3 + H_2O + CO_2 = 2KHCO_3$$

Tests—
- (*a*)—In colourless, right rhombic prisms, not deliquescent, of a saline feebly alkaline taste, not corrosive.
- (*b*)—Effervesces strongly with Diluted HCl.
- (*c*)—And the solution gives a yellow ppt. with Perchloride of Platinum ($PtCl_4$).

**Potassæ Bichromas ($K_2Cr_2O_7$).**

$$\left\{\begin{array}{l} 2(FeOCr_2O_3) + 4K_2CO_3 + O_7 = Fe_2O_3 + 4K_2CrO_4 + 4CO_2 \\ 2K_2CrO_4 + H_2SO_4 = K_2CrO_4,CrO_3 + K_2SO_4 + H_2O \end{array}\right.$$

Walter Smith.

Tests—
- (*a*)—In large, red, transparent, four-sided tables, anhydrous; fuses below redness; at a higher temperature is decomposed, yielding ***green oxide*** of Chromium.
- (*b*)—The solution, when digested with Sulphuric Acid and Rectified Spirit, acquires an ***emerald green colour.***

**Potassæ Carbonas ($K_2CO_3$).**

Tests—
- (*a*)—A white-crystalline powder, alkaline and caustic to the taste; very deliquescent; soluble in water but *insoluble* in spirit.
- (*b*) –Loses about 16 per cent. of its weight when exposed to a red heat.
- (*c*)—When supersaturated with Nitric Acid ($HNO_3$), and evaporated to dryness, the residue is almost entirely soluble in water (except a little Silica), and the Solution is pptd. only faintly by Chloride of Barium ($BaCl_2$), and Nitrate of Silver ($AgNO_3$), (absence of Sulphates or Chloride of Potassium in any quantity).

**Potassæ Chloras ($KClO_3$).**

$$\left\{\begin{array}{l} MnO_2 + 4HCl = Cl_2 + MnCl_2 + 2H_2O \\ 6Cl_2 + K_2CO_3 + 6CaH_2O_2 = 2KClO_3 + CaCO_3 + 5CaCl_2 + 6H_2O \end{array}\right.$$

**Potassæ Chloras ($KClO_3$).**—*Continued.*

TESTS—

(*a*)—In colourless, rhomboidal crystalline plates, with a cool, saline taste; sparingly soluble in cold water.

(*b*)—It explodes when triturated with sulphur.

(*c*)—Its solution is not affected by Nitrate of Silver ($AgNO_3$), (absence of Chloride of Potassium), or Oxalate of Ammonia $(NH_4)_2C_2O_4$ (absence of Chloride of Calcium).

(*d*)—By heat it fuses and gives off Oxygen Gas (O), and leaves a white residue, readily dissolving in water, forming a neutral solution, which is pptd. *white* by Nitrate of Silver, and *yellow* by Perchloride of Platinum ($PtCl_4$).

**Potassæ Citras ($K_3C_6H_5O_7$).**

$$3K_2CO_3 + 2H_3C_6H_5O_7 = 2K_3C_6H_5O_7 + 3H_2O + 3CO_2$$

TESTS—

(*a*)—A white powder, of saline, feebly acid taste deliquescent, and very soluble in water.

(*b*)—Heated with $H_2SO_4$ it forms a *brown* fluid; gives off inflammable gas, and evolves the odour of Acetic Acid.

**Potassæ Nitras ($KNO_3$).**

$$K_2CO_3 + 2HNO_3 = 2KNO_3 + H_2O + CO_2$$

TESTS—

(*a*)—In white crystalline masses or fragments of striated six-sided, colourless prisms.

(b)—Thrown on the fire it deflagrates.

(*c*)—Warmed in a test-tube, with Sulphuric Acid ($H_2SO_4$) and copper wire, it evolves *red fumes* from the formation of Nitric Oxide, which becomes changed by the Oxygen of the air into Nitrogen Peroxide ($N_2O_4$).

(*d*)—Its solution is not affected by Chloride of Barium ($BaCl_2$), (absence of Sulphate of Potash), or Nitrate of Silver ($AgNO_3$), (absence of Chloride of Potassium).

**Potassæ Permanganas ($KMnO_4$).**

$$\left\{\begin{array}{l} 6KHO + KClO_3 + 3MnO_2 = 3K_2MnO_4 + KCl + 3H_2O \\ 3K_2MnO_4 + 2H_2O = 2KMnO_4 + 4KHO + MnO_2 \end{array}\right.$$

**Potassæ Permanganas ($KMnO_4$).**—*Continued.*

TESTS—
(*a*)—In *dark purple*, prismatic crystals, inodorous, with a sweet taste; soluble in water.
(*b*)—A single, small crystal forms, with an ounce of water, a *rich purple solution*, which, when mixed with a little Rectified Spirit and heated, becomes *yellowish brown.*

**Potassæ Prussias Flava ($K_4FeCy_6 3H_2O$).**

$$6KCy + Fe + 2H_2O = K_4FeCy_6 + 2KHO + H_2O$$

TESTS—
(*a*)—In large *yellow* crystals; soluble in water, insoluble in alcohol.
(*b*)—The aqueous solution forms a *deep blue ppt.* with the Persulphate of Iron ($Fe_2 3SO_4$), a *brick-red ppt.* with Sulphate of Copper ($CuSO_4$), and a *white ppt.* with Acetate of Lead, $Pb(C_2H_3O_2)_2$.
(*c*)—Heated with diluted Sulphuric Acid ($H_2SO_4$), Hydrocyanic Acid vapours ($HCy$) are evolved.

**Potassæ Prussias Rubra ($K_3FeCy_6$).**—Appendix B.P.

$$2K_4FeCy_6 + 2Cl = 2(K_3FeCy_6) + 2KCl$$

TESTS—
(*a*)—In red prismatic crystals.
(*b*)—Gives a *blue ppt.* (Turnbull's blue $Fe_5Cy_{12}$) with Ferrous Sulphate ($FeSO_4$).
(*c*)—Its solution in water gives no ppt. with Ferric Salts, (absence of Ferrocyanide of Potassium —$K_4FeCy_6$).

**Potassæ Sulphas ($K_2SO_4$).**

$$K_2CO_3 + H_2SO_4 = K_2SO_4 + H_2O + CO_2$$

TESTS—
(*a*)—In colourless, hard, six-sided prisms; decrepitates strongly when heated; sparingly soluble in water, insoluble in alcohol.
(*b*)—The aqueous solution is neutral to litmus paper (absence of Acid Sulphate of Potassium ($KHSO_4$), gives no ppt. with Oxalate of Ammonia, $(NH_4)_2C_2O_4$), (absence of Calcium Salts).
(*c*)—Acidulated with Hydrochloric Acid, it is *pptd. white* ($BaSO_4$) by Chloride of Barium ($BaCl_2$).

**Potassæ Tartras ($K_2C_4H_4O_6$).**

$$2KHC_4H_4O_6 + K_2CO_3 = 2K_2C_4H_4O_6 + H_2O + CO_2$$

TESTS—

(*a*)—In small, colourless four or six-sided prisms.

(*b*)—Acetic Acid added sparingly to its solution causes the separation of a *white crystalline ppt.* ($KHC_4H_4O_6$)

(*c*)—Entirely dissolved by its own weight of water (absence of the Acid Tartrate of Potassium, —$KHC_4H_4O_6$).

**Potassæ Tartras Acida ($KHC_4H_4O_6$).**

$$2H_2C_4H_4O_6 + K_2CO_3 = 2KHC_4H_4O_6 + CO_2 + H_2O$$

TESTS—

(*a*)—A gritty, white powder, of a pleasant acid taste; sparingly soluble in water, insoluble in spirit.

(*b*)—It gives off inflammable gas, and leaves a black residue on the application of heat.

(*c*)—This residue dissolves in HCl, and the solution gives a *yellow ppt.* with $PtCl_4$.

**Potassii Bromidum (KBr).**

$$\begin{cases} 6KHO + Br_6 = 5KBr + KBrO_3 + 3H_2O \\ 5KBr + KBrO_3 + 3C + = 6KBr + 3CO \end{cases}$$

TESTS—

(*a*)—In colourless cubical crystals, without smell (absence of Bromine, Br.), having a pungent saline taste; readily soluble in water, less soluble in spirit.

(*b*)—When its solution in water is mixed with a little Chlorine (Cl), Chloroform ($CHCl_3$) shaken with it, on falling to the bottom, shows a *red colour* (Bromine).

(*c*)—A solution of the salt, mixed with Mucilage of Starch, and a drop of an aqueous solution of Bromine or Chlorine, does not show any *blue colour* (absence of Iodine—I).

**Potassii Iodidum (KI).**

$$\begin{cases} 6KHO + I_6 = 5KI + KIO_3 + 3H_2O \\ 5KI + KIO_3 + C_3 = 6KI + 3CO \end{cases}$$

TESTS—

(*a*)—In colourless, generally opaque, cubic crystals, readily soluble in water, and in a less degree in spirit.

TESTS—

(*b*)—Its solution in water gives with Mucilage of Starch, and a few drops of Solution of Chlorine, a ***blue colour.***

(*c*)—The addition of Tartaric Acid to its solution in water, mixed with Mucilage of Starch, ***does not*** develope a ***blue colour*** (absence of Iodate of Potassium).

(*d*)—Solution of Nitrate of Silver ($AgNO_3$), added in excess, forms a ***yellowish-white ppt.*** which, when shaken with Ammonia, yields by subsidence a clear solution, in which excess of Nitric Acid ($HNO_3$) causes no turbidity (absence of Chloride of Potassium).

(*e*)—Its solution in water is only faintly pptd. by the addition of Saccharated Solution of Lime (absence of Carbonate of Potash).

***General Tests of the Potassium Salts*—***

TESTS—

(*a*)—Change ***red*** litmus paper ***blue.***

(*b*)—Give a crystalline ppt ($HKC_4H_4O_6$) with Tartaric Acid ($H_2C_4H_4O_6$).

(*c*)—Give a yellow ppt. ($2KCl + PtCl_4$) with Perchloride of Platinum ($PtCl_4$).

(*d*)—Give a violet colour to the blowpipe flame, easily seen when viewed through blue glass ; while the ***yellow colour*** produced by Sodium Salts in the blowpipe flame ***cannot*** be seen through blue glass.

## Quiniæ Sulphas ($(C_{20}H_{24}N_2O_2)_2H_2SO_4 7H_2O$.)

TESTS—

(*a*)—In filiform, silky, snow-white crystals, of a pure intensely bitter taste; sparingly soluble in water, yet imparting to it a peculiar bluish tint.

(*b*)—The solution gives with Chloride of Barium ($BaCl_2$) a ***white ppt.*** (Sulphate of Barium—$BaSO_4$), insoluble in Nitric Acid ($HNO_3$), and when treated with Solution of Chlorine, and afterwards with Solution of Ammonia, it becomes of a splendid ***emerald green colour,*** (thalleiochine is produced).

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* ☞ All the official Potassium Salts are colourless except the Bichromate *(red)*, the two Prussiates *(red and yellow)*, the Permanganate *(purple)*, and the Sulphurated *(which is liver green).*

TESTS—

(*c*)—Dissolves in pure Sulphuric Acid ($H_2SO_4$), with a *feeble yellowish tint*, and undergoes *no* further change of colour when gently warmed (absence of Salicin, which would give by this process a *deep red colour*).

(*d*)—It is pptd. from its solution in Sulphuric Acid (*white*) by Ammonia, and this white ppt. (Quinia) re-dissolves on shaking with Ether, without the production of any crystalline matter floating on the lower of the two strata into which the shaken fluid separates on rest (absence of Quinidia or Cinchonia).

**Santoninum ($C_{16}H_{18}O_3$).**

TESTS—

(*a*)—In colourless, flat, rhombic prisms, feebly bitter. Scarcely soluble in cold water (absence of GumArabic), sparingly in boiling water, but abundantly in Chloroform and in boiling Rectified Spirit. Fusible and Sublimable.

(*b*)—Sunlight renders it yellow. It is not dissolved by diluted Mineral Acids.

(*c*)—Entirely destructible by a red heat, with free access of air (absence of mineral matter).

(*d*)—Its solution in alcohol does not burn with a *green* flame (absence of boracic acid),

**Soda Caustica (NaHO).**

$$Na_2CO_3 + Ca2HO = 2NaHO + CaCO_3$$

TESTS—

(*a*)—Hard and greyish-white; very alkaline and corrosive.

(*b*)—It imparts a *yellow colour* to flame, and its solution in water, acidulated by Nitric Acid ($HNO_3$) gives only a scanty *white ppt.* with Nitrate of Silver (absence of Chloride of Sodium), and Chloride of Barium ($BaCl_2$), (absence of more than a small quantity of Sulphate of Soda).

**Soda Tartarata ($NaKC_4H_4O_6 4H_2O$).**

$$Na_2CO_3 + 2KHC_4H_4O_6 = 2NaKC_4H_4O_6 + H_2O + CO_2$$

TESTS—

(*a*)—In colourless, transparent prisms, or halves of prisms, of the right rhombic order, generally eight-sided, tasting like common salt. Entirely soluble in cold water.

(*b*)—Heated with $H_2SO_4$ it chars, and leaves a residue of Carbonates of Sodium and Potassium.

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**Sodæ Acetas ($NaC_2H_3O_2,3H_2O$).**

$$Na_2CO_3 + 2HC_2H_3O_2 = 2NaC_2H_3O_2 + H_2O + CO_2$$

TESTS—
(*a*)—In transparent, colourless crystals, soluble in water; forming a solution neutral to test paper.
(*b*)—The solution when diluted is *not pptd.* by Chloride of Barium ($BaCl_2$), (absence of Sulphate of Soda or Calcium), or Nitrate of Silver ($AgNO_3$—absence of Chloride of Sodium or Calcium).
(*c*)—It chars by heat, and becomes changed into Carbonate of Soda.

**Sodæ Arsenias ($Na_2HAsO_4 7H_2O$).**

$$\begin{cases} As_2O_3 + 2NaNO_3 + Na_2CO_3 = Na_4As_2O_7 + N_2O_3 + CO_2 \\ Na_4As_2O_7 + H_2O = 2Na_2HAsO_4 \end{cases}$$

TESTS—
(*a*)—In colourless, transparent prisms, soluble in water.
(*b*)—The solution is alkaline, giving *white ppts.* with Chloride of Barium ($BaCl_2$), Chloride of Calcium ($CaCl_2$), and Sulphate of Zinc ($ZnSO_4$), and a *brick-red ppt.* with Nitrate of Silver ($AgNO_3$).

**Sodæ Bicarbonas ($NaHCO_3$).**

$$Na_2CO_3 + H_2O + CO_2 = 2NaHCO_3$$

TESTS—
(*a*)—In powder, or small opaque irregular white scales, which give a yellow colour to flame.
(*b*)—Dissolves with much effervescence in diluted Hydrochloric Acid (HCl), forming a solution in which Perchloride of Platinum ($PtCl_4$) causes *no ppt.* (absence of Potassium Compounds).
(*c*)—A solution of the salt in cold water gives a *white* and *not a coloured ppt.* with Solution of Perchloride of Mercury ($HgCl_2$), absence of Carbonate of Sodium—$Na_2CO_3$).
(*d*)—When supersaturated with Nitric Acid ($HNO_3$) its solution *scarcely ppts.* with Chloride of Barium ($BaCl_2$), or Nitrate of Silver ($AgNO_3$), (absence of more than a small trace of Sulphates or Chlorides).

### Sodæ Carbonas ($Na_2CO_3 10H_2O$).

$$\left\{\begin{array}{l} 2NaCl + H_2SO_4 = Na_2SO_4 + 2HCl \\ Na_2SO_4 + C_4 = Na_2S + 4CO \\ Na_2S + CaCO_3 = Na_2CO_3 + CaS \end{array}\right.$$

TESTS—
- (*a*)—In transparent, laminar crystals, of a rhombic shape, efflorescent; with a strong alkaline taste and reaction.
- (*b*)—Its solution in Hydrochloric Acid (HCl) ***does not*** give a ppt. with Perchloride of Platinum (absence of Potassium Salts).
- (*c*)—When supersaturated with Nitric Acid ($HNO_3$) it ppts. ***only slightly*** with Chloride of Barium ($BaCl_2$), or Nitrate of Silver ($AgNO_3$ (absence of more than a mere trace of Sulphates or Chlorides).

### Sodæ Chloratæ Liquor (NaCl,NaClO).

$$\left\{\begin{array}{l} MnO_2 + 4HCl = MnCl_2 + 2H_2O + Cl_2 \\ Cl_2 + H_2O + 2Na_2CO_3 = NaCl.NaClO + 2NaHCO_3 \end{array}\right.$$

TESTS—
- (*a*)—A colourless, alkaline liquid, with astringent taste and slight smell of Chlorine (Cl).
- (*b*)—It decolorises Sulphate of Indigo.
- (*c*)—It effervesces with Hydrochloric Acid, evolving Chlorine (Cl) and Carbonic Acid ($CO_2$), and forming a solution which ***does not*** ppt. with Perchloride of Platinum ($PtCl_4$—absence of Potassium Salts).

### Sodæ Hypophosphis ($NaPH_2O_2$).

$$Ca2PH_2O_2 + Na_2CO_3 = 2NaPH_2O_2 + CaCO_3$$

TESTS—
- (*a*)—A white, granular salt, having a bitter taste.
- (*b*)—It is deliquescent; very soluble in Water and Spirit, but insoluble in Ether.
- (*c*)—At a red heat it ignites, emitting spontaneously inflammable Phosphuretted Hydrogen ($PH_3$).

### Sodæ Nitras ($NaNO_3$).—Native.

TESTS—
- (*a*)—In colourless, obtuse, rhombohedral crystals.
- (*b*)—Thrown on the fire it deflagrates; warmed in a test-tube with Sulphuric Acid ($H_2SO_4$) and copper wire (Cu) it evolves ***ruddy*** fumes.

**TESTS**—(*c*)—Its solution gives *no ppt.* with Nitrate of Silver ($AgNO_3$), or Chloride of Barium ($BaCl_2$), (absence of Chlorides and Sulphates).

**Sodæ Phosphas ($Na_2HPO_412H_2O$).**

$$Ca_32PO_4 + 2H_2SO_4 = CaH_42PO_4 + 2CaSO_4$$

$$CaH_42PO_4 + Na_2CO_3 = Na_2HPO_4 + H_2O + CO_2 + CaHPO_4$$

**TESTS**—
(*a*)—In transparent, colourless rhombic prisms, efflorescent and tasting like common salt.
(*b*)—Its solution in water has a faintly alkaline reaction. It gives a *yellow* ppt ($Ag_3PO_4$), with Nitrate of Silver ($AgNO_3$), the resulting fluid becoming Acid.
(*c*)—Heated to dull redness it loses 63 per cent. of its weight, leaving a residue which, when dissolved in water, gives with Chloride of Barium ($BaCl_2$) a ppt. almost entirely soluble in diluted Nitric Acid ($HNO_3$), absence of more than a trace of Sulphate of Soda).

**Sodæ Sulphas ($Na_2SO_410H_2O$).**

$$NaCl + H_2SO_4 = HCl + NaHSO_4$$

$$2HNaSO_4 + Na_2CO_3 = 2Na_2SO_4 + H_2O + CO_2$$

**TESTS**—
(*a*)—In transparent, oblique prisms; has a salt and bitter taste, efflorescent. Soluble in water, insoluble in spirit.
(*b*)—Exposed to heat in a porcelain crucible it loses 55·9 per cent of water.
(*c*)—Heated with solution of Potash (KHO) no smell of Ammonia ($NH_4HO$) is evolved (absence of Ammonium Salts), and *no ppt.* is formed (absence of Iron or Manganese).

**Sodæ Valerianas ($NaC_5H_9O_2$).**

$$C_5H_{11}HO + O_2 = C_6H_{10}O_2 + H_2O$$

$$C_5H_{10}O_2 + NaHO = NaC_5H_2O_2 + H_2O$$

**TESTS**—
(*a*)—In white masses, without alkaline reaction (absence of free soda), entirely soluble in spirit (absence of Carbonate of Soda).
(*b*)—Gives out a powerful smell of valerian on the addition to it of diluted Sulphuric Acid ($H_2SO_4$).

**Sodii Chloridum ($NaCl$).**—Native.

TESTS—

(*a*)—In small, white crystalline grains, or transparent cubic crystals, free from moisture; has a purely saline taste; imparts a *yellow* colour to flame; is soluble in water.

(*b*)—The solution in water is *not* pptd. by Perchloride of Platinum ($PtCl_4$), (absence of Potassium Salts), but gives a *white ppt.* ($AgCl$) with Nitrate of Silver ($AgNO_3$), soluble in Ammonia ($NH_4HO$), but insoluble in Nitric Acid ($HNO_3$).

*Test of the Sodium Salts*—*

All are soluble and give a *yellow* colour to the flame when heated on a loop of Platinum wire. This yellow colour is not visible when looked at through blue glass.

**Strychnia ($C_{21}H_{22}N_2O_2$)**

TESTS—

(*a*)—In right, square octahedrons or prisms, colourless and inodorous; sparingly soluble in water, but communicating to it its intensely bitter taste. Soluble in boiling Rectified Spirit and in Chloroform, but not in absolute Alcohol or in Ether.

(*b*)—Pure Sulphuric Acid ($H_2SO_4$) forms with it a colourless solution, which, on the addition of Bichromate of Potash ($K_2Cr_2O_7$), acquires an intensely *violet* hue, speedily passing through red to yellow.

(*c*)—Not coloured by Nitric Acid ($HNO_3$), but if Brucia be present the solution becomes *red* when heated.

(*d*)—Oxide of Lead $PbO_2$, added after $H_2SO_4$, gives a play of colours from *blue* to *yellow*.

(*e*)—In a similar way Ferrocyanide of Potassium $K_4FeCy_6$, changes the solution in $H_2SO_4$ to *violet*.

(*f*)—The Physiological Test—A few drops of the suspected liquid, injected under the skin of a young frog, if Strychnia be present, rapidly cause tetanic convulsions and death.

(*g*)—Leaves no Ash when burned with free access of air.

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* ☞ All the official Soda Salts are devoid of colour.

**Sulphur Præcipitatum (S).**

$$\begin{cases} 12S + 3CaH_2O_2 = 2CaS_5 + CaS_2O_3 + 3H_2O \\ 2CaS_5 + CaS_2O_3 + 6HCl = 6S_2 + 3CaCl_2 + 3H_2O \end{cases}$$

TESTS—
- (*a*)—A greyish-yellow, soft powder, free from grittiness, and from the smell of Sulphuretted Hydrogen ($H_2S$).
- (*b*)—Entirely volatilised by heat. Under the microscope it is seen to consist of opaque globules without any admixture of crystalline matter; (absence of Sulphate of Calcium).
- (*c*)—When heated in an open vessel it burns with a blue flame, and the evolution of Sulphurous Acid.

**Sulphur Sublimatum (S).**

TESTS—
- (*a*)—A slightly gritty powder, of a fine greenish-yellow colour, without taste or smell, unless when heated; burning in open vessels, with a blue flame, and the evolution of Sulphurous Acid.
- (*b*)—Entirely volatilised by heat; does not redden moistened litmus paper (absence of traces of Sulphuric ($H_2SO_4$) or Sulphurous ($H_2SO_3$) Acids).
- (*c*)—Solution of Ammonia ($NH_4HO$) shaken with it and filtered does not, on evaporation, leave any residue (absence of Orpiment—$As_2S_3$).

**Sulphuris Iodidum ($S_2I_2$).**

$$S_2 + I_2 = S_2I_2$$

TESTS—
- (*a*)—A greyish-black, solid substance, with a radiated crystalline appearance.
- (*b*)—It has the smell of Iodine, and stains the skin when applied to it.
- (*c*)—If 100 grains be thoroughly boiled with water, the Iodine will pass off in vapour, and about 20 grains of Sulphur will remain.

**Zinci Acetas ($Zn\ (C_2H_3O_2)_2 2H_2O$).**

$$ZnCO_3,2ZnO + 6HC_2H_3O_2 = 3(Zn2C_2H_3O_2) + 3H_2O + CO_2$$

TESTS—

(*a*)—Thin translucent, crystalline plates, having a sharp, unpleasant taste. Soluble in water.

(*b*)—A dilute, watery solution is *not* affected by Chloride of Barium ($BaCl_2$), (absence of Sulphates), or Nitrate of Silver ($AgNO_3$), (absence of Chlorides); and when slightly acidulated with Hydrochloric Acid ($HCl$) is *not* pptd. by Sulphuretted Hydrogen ($H_2S$), (absence of Arsenic, Copper, &c).

(*c*)—After it has been boiled for a few minutes, with a little Nitric Acid ($HNO_3$), it yields with Ammonia ($NH_4HO$) *a white ppt.* entirely soluble, without colour, in excess of the reagent (absence of Iron).

**Zinci Carbonas ($ZnCO_3(ZnO)_2 3H_2O$).**

$$3ZnSO_4 + 3H_2O + 3Na_2CO_3 = ZnCO_3(ZnO)_2,3H_2O + 3Na_2SO_4 + 2CO_2$$

TESTS—

(*a*)—White, tasteless, without smell, insoluble in water, soluble with effervescence in diluted Nitric Acid ($HNO_3$).

(*b*)—This solution is not affected by Chloride of Barium ($BaCl_2$), (absence of Sulphates), or Nitrate of Silver ($AgNO_3$), (absence of Chlorides), and gives with Carbonate of Ammonia ($N_4H_{16}C_3O_8$) *a white ppt.* entirely soluble without colour in an excess of the reagent (absence of Copper).

**Zinci Chloridum ($ZnCl_2$).**

$$Zn_2 + 4HCl = 2ZnCl_2 + 2H_2$$

TESTS—

(*a*)—Colourless, opaque rods or tablets, very deliquescent; soluble almost entirely in Water, Alcohol, and Ether.

(*b*)—The watery solution, if first acidulated with Hydrochloric Acid ($HCl$), is *not* affected by Sulphuretted Hydrogen ($H_2S$), (absence of Arsenic, Lead, or Copper).

(*c*)—Its watery solution is not affected by Chloride of Barium ($BaCl_2$), (absence of Sulphates), or Oxalate of Ammonia ($(NH_4)_2C_2O_4$), (absence of Calcium Salts), and it *is not tinged blue* by yellow or red Prussiate of Potash (absence of Ferric or Ferrous Salts).

**Zinci Oxidum ($ZnO$).**

$$ZnCO_3,(ZnO)_2 2H_2O = 3ZnO + 2H_2O + CO_2$$

TESTS—

(*a*)—A soft, nearly white, tasteless, inodorous powder, becoming pale yellow when heated.

(*b*)—Dissolves without effervescence in dilute Nitric Acid ($HNO_3$), (absence of Carbonate of Zinc) ($(ZnCO_3.)ZnO)_2 3H_2O)$, forming a solution which is *not* affected by Chloride of Barium ($BaCl_2$), absence of Sulphates), or Nitrate of Silver ($AgNO_3$), absence of Chlorides), and gives with Carbonate of Ammonia ($N_4H_{16}C_3O_8$) a *white ppt.* entirely soluble without colour in an excess of the reagent (absence of Copper).

**Zinci Sulphas ($ZnSO_4.7H_2O$).**

$$Zn_2 + 2H_2SO_4 + H_2O = 2ZnSO_4 + H_2O + H_4$$

TESTS—

(*a*)—In colourless, transparent, prismatic crystals, with a strong metallic, astringent taste, soluble in water.

(*b*)—Its solution in water is *not* tinged purple by Tincture of Galls (absence of Iron), and when acidulated with Hydrochloric Acid ($HCl$) gives *no ppt.* with Sulphuretted Hydrogen ($H_2S$). After being boiled with Nitric Acid ($HNO_3$) it yields with Ammonia a *white ppt.*, soluble without colour in an excess of the reagent (absence of Copper).

**Zinci Valerianas ($Zn(C_5H_9O_2)_2$).**

$$ZnSO_4 + 2NaC_5H_9O_2 = Zn2C_5H_9O_2 + Na_2SO_4$$

TESTS—

(*a*)—In brilliant, white, pearly, tabular crystals, with a feeble smell of Valerianic Acid, and a metallic taste. Soluble in hot water and alcohol.

(*b*)—Its solution in hot water is not pptd. by Chloride of Barium ($BaCl_2$), (absence of Sulphates).

*Tests of Zinc Salts*—

TESTS—

(*a*)—Sulphide of Ammonium ($(NH_4)_2S$) gives a *white ppt.* soluble in Mineral Acids.

(*b*)—Soda, or Potash or Ammonia, gives a *white ppt.*

(*c*)—"Heated on charcoal, with $Na_2CO_3$ in the reducing blow-pipe flame, gives a *yellow* incrustation, which, on cooling, becomes *white*, and, if moistened with Chloride of Cobalt, forms an infusible *green* mass."—Jones.

# WEIGHTS AND MEASURES OF THE BRITISH PHARMACOPŒIA.

### WEIGHTS.

| | | | |
|---|---|---|---|
| 1 Grain | gr. | | |
| 1 Ounce | oz. | | = 437·5 grains |
| 1 Pound | lb. | = 16 ounces | = 7000 „ |

### MEASURES OF CAPACITY.

| | | |
|---|---|---|
| 1 Minim | min. | |
| 1 Fluid Drachm | fl. drm. | = 60 minims |
| 1 Fluid Ounce | fl. oz. | = 8 fluid drachms |
| 1 Pint | O. | = 20 fluid ounces |
| 1 Gallon | C. | = 8 pints |

### MEASURES OF LENGTH.

1 line = $\frac{1}{12}$ inch
1 inch = $\frac{1}{39{\cdot}1393}$ seconds pendulum
12 „ = 1 foot
36 „ = 3 „ = 1 yard

Length of pendulum vibrating seconds of mean time in the latitude of London, in a vacuum at the level of the sea. . } 39·1393 inches.

### RELATION OF MEASURES TO WEIGHTS.

| | | | | |
|---|---|---|---|---|
| 1 Minim is the measure of | | | 0·91 | grains of water |
| 1 Fluid Drachm | „ | | 54·68 | „ |
| 1 Fluid Ounce | „ | 1 ounce or | 437·5 | „ |
| 1 Pint | „ | 1·25 pounds or | 8750·0 | „ |
| 1 Gallon | „ | 10 pounds or | 70,000·0 | „ |

## WEIGHTS AND MEASURES OF THE METRICAL SYSTEM.

### WEIGHTS.

| | | | | |
|---|---|---|---|---|
| **1 Milligramme** | =the thousandth part of one grm. or | | 0·001 | grm. |
| **1 Centigramme** | =the hundredth | ,, | 0·01 | ,, |
| **1 Decigramme** | =the tenth | ,, | 0·1 | ,, |
| **1 Gramme** | =weight of a cubic centimetre of water at 4° C. | | 1·0 | ,, |
| **1 Decagramme** | =ten grammes | ,, | 10·0 | ,, |
| **1 Hectogramme** | =one hundred grammes | ,, | 100·0 | ,, |
| **1 Kilogramme** | =one thousand grammes | ,, | 1000·0 | ,, |

### MEASURES OF CAPACITY.

| | | | | | |
|---|---|---|---|---|---|
| **1 Millilitre** = | 1 cub. centim. or the mea. of | | 1 gram. of water | | |
| **1 Centilitre** = | 10 | ,, | 10 | ,, | ,, |
| **1 Decilitre** = | 100 | ,, | 100 | ,, | ,, |
| **1 Litre** = | 1000 | ,, | 1000 | ,, | (1 kilo.) |

### MEASURES OF LENGTH.

| | | | | |
|---|---|---|---|---|
| **1 Millimetre** | =the thousandth part of one metre or | | 0·001 | metre |
| **1 Centimetre** | =the hundredth | ,, | 0·01 | ,, |
| **1 Decimetre** | =the tenth part | ,, | 0·1 | ,, |
| **1 Metre** | =the ten-millionth part of a quarter of the meridian of the earth. | | | |

### RELATION OF THE WEIGHTS OF THE BRITISH PHARMACOPŒIA TO THE METRICAL WEIGHTS.

| | | | |
|---|---|---|---|
| 1 Pound | = | 453·5925 | grammes |
| 1 Ounce | = | 28·3495 | ,, |
| 1 Grain | = | 0·0648 | ,, |

### RELATION OF MEASURES OF CAPACITY OF THE BRITISH PHARMACOPŒIA TO THE METRICAL MEASURES.

| | | | | |
|---|---|---|---|---|
| 1 Gallon | =4·543487 | litres | | |
| 1 Pint | =0·567936 | ,, | or 567·936 | cubic centimetres |
| 1 Fluid Ounce | =0·028396 | ,, | 28·396 | ,, |
| 1 Fluid Drachm | =0·003549 | ,, | 3·549 | ,, |
| 1 Minim | =0·000059 | ,, | 0·059 | ,, |

## RELATION OF THE METRICAL WEIGHTS TO THE WEIGHTS OF THE BRITISH PHARMACOPŒIA.

1 Milligramme = 0·015432 grs.
1 Centigramme = 0·15432 „
1 Decigramme = 1·5432 „
1 Gramme = 15·432 „
1 Kilogramme = 2 lbs. 3 oz. 119·8 grs. or 15432·348 „

## RELATION OF THE METRICAL MEASURES TO THE MEASURES OF THE BRITISH PHARMACOPŒIA.

1 Millimetre = 0·03937 inches
1 Centimetre = 0·39371 „
1 Decimetre = 3·93708 „
1 Metre = 39·37079 „ or 1 yard 3·7 inches
1 Cubic centimetre = 15·432 grain-measures
1 Litre = 1 pint 15 oz. 2 drs. 11 m. or 15432·348 grain-measures

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